Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico..... $5.00
Canada 6.00
Foreign Countries (excepting daily editions)..... 8.00
Single copies.....15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, $1; foreign, $2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,294 were mailed to regular paid subscribers to the weekly edition, 155 were provided for counter and news companies' sales, 1,038 were mailed to advertisers, exchanges and correspondents, and 263 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 450,900, an average of 9,202 copies a week.

The RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

VOLUME 59 DECEMBER 3, 1915 No. 23

Contents

*Illustrated.

It appears that the optimism inspired by the generosity of the Missouri Public Service Commission, in allowing the railroads of the state to make general advances in their freight and passenger rates, was to a certain extent unfounded. The commission authorized the roads to charge 2½ cents a mile for one-way tickets, 2¼ cents a mile for round trip tickets and 2 cents a mile for mileage books, whereas the roads had asked for a fare of 3 cents a mile in place of the existing fare of 2 cents. The decision, while granting less than the railroad men had declared necessary, bore the semblance of a well-intended compromise, at least. But the executive officers of the Missouri roads, after a study of the commission's order, point out that "the conditions under which the advance is permitted prevent the railroads from getting it," because they are required to sell 500 and 1,000 mile mileage tickets, good for bearer and any number of persons, to be used within one year, at the rate of 2 cents a mile. Under these conditions it is evident that the sale of individual one-way or round trip tickets will be materially reduced. Mileage books are ordinarily sold under certain restrictions which confine their use to persons who travel extensively, such as commercial travelers, on the theory that a wholesale business is entitled to a reduced rate. The order of the commission brings the purchase of these tickets within the reach of the majority of travelers at a reduction of 20 per cent under the rate for one-way tickets and makes possible a practice which prevailed in New England when the standard rate was 3 cents. Hotels, saloons, grocery, cigar and drug stores, and even many local capitalists with $100 or so to risk, used to buy Boston & Maine mileage books at 2 cents a mile and rent them out to anyone they were willing to trust to return the book with payment for the mileage used at 2¼ cents a mile. This plan of scalping was taken advantage of by people who did not travel enough to warrant the investment of the price of a book of their own and who were therefore not entitled to the reduced rate. The commission advances the threadbare argument that the sale of mileage tickets at this low rate will increase travel, while admitting elsewhere in its opinion that the present 2-cent fare has not increased travel sufficiently to offset the loss in revenue.

The Commission Giveth and the Commission Taketh Away

The New York Times recently published a large number of figures taken from "Statistics of Railways, 1904-1914, United States," a bulletin issued by the Bureau of Railway Economics. These figures show—although the bulletin itself does not call attention to the fact—that for years the expenses and taxes of the railways have been increasing much faster than their earnings. Under the caption, "The Omitted Table," the Des Moines Register and Leader editorially castigates the New York Times for not having published a table showing the dividends the railways paid during this period. The Freeport (Ill.) Bulletin takes the matter up and chastises the "railway statisticians" for not having presented these figures. The "railway statisticians" were not guilty of the offense attributed to them. The very statistics regarding dividends which the Freeport Bulletin quotes from the Des Moines Register and Leader were taken by it from page 14 of the bulletin compiled and published by the reviled "railway statisticians." The Register and Leader and the Bulletin make much of the fact that the increase in the total dividends declared during this period was 100 per cent. The implication is that the railways were abnormally prosperous. But, curiously enough, the virtuous Register and Leader, in calling attention to "The Omitted Table," itself omitted certain columns from that same table. These columns showed, among other things, that in 1904 42.53 per cent of the railway stock outstanding did not receive a cent of dividend, the average paid on all stock being only 3.5 per cent; and that in 1914, 35 per cent of the stock received no dividend, the average on the total being only 5.2 per cent. Furthermore, total dividends paid in 1914 were swelled abnormally by a distribution of $86,000,000 made by the Harriman system in connection with its dissolution under a decree of the United States Supreme Court. The average percentage paid in 1913 was only 4.28. Why has the average dividend increased only from 3.5 to 5.2 per cent, while the total dividends paid have increased 100 per cent? The answer is that between 1904 and 1914 the investment in the road and equipment of the railways of the United States increased, according to the statistics of the Interstate Commerce Commission, from $10,511,537,131 to $16,936,697,840, or 61 per cent, a great part of which represented capital raised by the sale of stock. In the absence of the large extra disbursement made by the Harriman lines in the effectuation of their dissolution the dividends paid in 1914 would have been only 64 per cent greater than in 1904, although, as already shown, 43 per cent of all the stock outstanding in 1904 received not a cent of dividend. When

Omitted Columns in "The Omitted Table"

the ostentatiously knowing and virtuous Register and Leader set out to correct the New York Times, why did it not finish the story?

Unreasonable Limitation of Work-Hours

The right to hire a man to work ten hours a day, in an ordinarily healthful occupation—if the employee is willing to enter into such a contract—is one of the primary rights enjoyed by everybody under the constitution. This salutary declaration of fundamental law was delivered by the United States Supreme Court, and has just been reaffirmed by the Supreme Court of Massachusetts, as reported last week, page 1026. In other words, laws limiting hours of labor have no just basis except as it is found in the actual needs of the individual or of society. It would be well if this principle were enunciated more frequently by the press and other leaders of public opinion. The higher courts, speaking only at infrequent intervals, and to restricted audiences, seem to be our only impressive mouthpieces for this and many cognate truths, which are of the first importance. This Massachusetts law, under which a criminal indictment was found against the Boston & Maine, limited station-baggage-men's hours to nine a day, and included also other employees around passenger stations, such as crossing tenders. It was a flagrant illustration of the "progressive" character of the labor leaders' demands. They first got a law limiting street railway mens' hours; then, the next year—we speak from memory—a similar law making the day an hour shorter; and then the same thing applied to steam railroad employees. Except for the mandate of the court, the successive legislatures apparently could have been induced easily to keep on till the work day was reduced to six hours, or less; or until the labor leader should become ashamed of his own audacity and turn his efforts in some other direction. Not the least noticeable of the harmful tendencies in matters connected with labor legislation is the attitude of the press in its attempts always to be friendly to "the masses." This Massachusetts decision, as printed in the New York Tribune, is headed "Robs Men of Rest Hour." Instead of working from say, 7 to 5, with an hour out for dinner, the station men—unless they can show that they are overworked—will have to work the old-fashioned day, 7 to 6, with one hour out. There may be some occupations in which, for social reasons, the working day should be restricted to 10 hours or less by law; but these must be very few; and certainly that of station baggage-men is not one of them.

THE SMOKE NUISANCE AND ELECTRIFICATION IN CHICAGO

FOR some years there has been a vigorous agitation in favor of legislation to require the railways entering Chicago to electrify their terminals in that city. The principal, and in fact almost the only, argument for such action has been the contention that it is needed to reduce the smoke nuisance. About four years ago the Association of Commerce, the leading civic organization of the city, took a hand in the matter. It created a commission to investigate thoroughly the subject of smoke prevention and electrification of railroad terminals. Four of the members were appointed by the city, four by the railroads and nine by the Association of Commerce. The commission employed a strong staff of experts and made the most comprehensive study, both of smoke prevention and of electrification of terminals ever conducted. The necessary funds were furnished by the railroads.

The conclusions reached by the commission in its report, which has just been made public, and an abstract of which is published in another column, may be briefly summarized. It finds that smoke in the atmosphere probably does not have the deleterious effects on the health usually attributed to it. It finds further that steam locomotives cause only 10 per cent of the total smoke in Chicago. This is only one-half as much as is attributed to furnaces for metallurgical and manufacturing processes, or low-pressure steam and other stationary heating plants, and only one-fourth as much as is attributed to high-pressure steam and stationary heating plants. Therefore, electrification of all the terminals would not remedy, and in fact would cause only a small and temporary reduction in the smoke nuisance.

As to electrification, the commission has ascertained that its application to all the terminals in Chicago would include 3,476 miles of track, which exceeds the entire mileage of steam railways thus far electrified in the entire world. It does not believe that the best system for electric operation has yet been definitely enough determined to justify, from a technical or a practical point of view, legislation requiring the carrying out at present of such an enormous project. It finds, however, that electrification is technically practical, but financially impractical. The estimated cost in Chicago would be $178,127,230. Railways which have investigated the subject individually report, however, that for practical operating reasons it would be necessary for them to extend electrification beyond the zone covered by the commission, and this would increase the total cost to $274,440,630. The commission finds that electrification would make it practicable to effect certain operating economies, but on the other hand, it would cause an enormous increase in fixed charges, and the annual loss which it would cause is placed at $14,600,000. The loss on the basis of the railways' estimate as to the mileage, which for practical reasons it would be necessary to include, would be much larger.

It is not reasonably to be expected that this report will be received favorably by those who have been agitating the question of electrification in Chicago. But it will be much easier to find fault with the commission than to controvert the evidence it presents or to refute its conclusions. Its finding that smoke it not so harmful to health as has been assumed is important, but not necessarily decisive, since most people will not find it agreeable to live in an atmosphere of smoke, even though assured that its only effect is as a producer of dirt. The evidence given that Chicago is not as smoky as some other cities is rather damaging to the atmosphere of these other cities than creditable to that of Chicago.

Of widely different significance are the data presented showing the relatively small amount of the smoke nuisance which is fairly attributed to steam locomotives. The facts presented demonstrate that legislation requiring electrification cannot be justified by the effect which would be produced on the smoke nuisance, for after the money had been spent, the improvement effected would be so small as not to be noticeable. Electrification would involve the construction of large power houses, which themselves would emit smoke, and in consequence the net reduction in smoke is estimated by the commission at only 5 per cent.

It is being alleged in some quarters that the commission has wasted time and money in investigating the question of the electrification of all the city's terminals, it being asserted that this is not the end toward which the agitation has been directed. But the demand has been for the electrification of all terminals, as can be demonstrated by the records. Every proposed ordinance which has been drafted has provided for general electrification. Furthermore, if it is the electrification of only certain suburban lines that is demanded, then the smoke nuisance has nothing to do with the matter, because the electrification of only a few lines would not materially reduce even the amount of locomotive smoke produced. The commission shows that locomotives engaged in suburban service on all roads contribute only 1.54 per cent of the visible smoke, 1.97 per cent of the dust and cinders of smoke, and less than 1 per cent of the total polluting gases discharged into the atmosphere.

There can hardly be any serious exception taken to the commission's conclusion that, even though electrification in Chicago were desirable, it would be almost impossible to decide what system should be adopted. The Chicago problem involves 38 railroads, as against only 37 steam roads throughout the world

that have been partially electrified. It involves a network of tracks and yards incomparably more extensive and complicated than exists elsewhere. Its solution could not be carried out by individual lines, but would involve joint action by all. In determinining the system to be adopted, each line necessarily would think of the conditions on its lines outside of Chicago with which it would have to deal if the use of electricity should be extended. It would, therefore, be impossible to get experts voluntarily to agree as to what system should be adopted in Chicago, and if some system should be adopted under the compulsion of law it is probable that future experience would demonstrate that great and costly mistakes had been made. In view of these views, it would be the height of folly to incur the risk of an investment of $275,000,000, or even of $178,000,000, to secure a reduction of perhaps 5 per cent in the smoke in the atmosphere of a single city.

In spite of the engineering and operating difficulties in the way, the commission finds that electrification is technically feasible, but decides that it is financially impracticable. The reasons it presents for this conclusion appear incontrovertible. The Chicago lines, under the requirements of city ordinances, already have spent $80,000,000 for track elevation and must spend a total of $150,000,000. They have invested many millions in passenger terminals, and must invest literally hundreds of millions more. If the cost of electrification, in addition to that of these other improvements, were to be spread over their entire traffic, people throughout the country would be required to pay for investments which would benefit Chicago alone. If rates were so adjusted as to make the traffic of Chicago bear the load of all the actual and proposed expenditures, the effects would be disastrous for Chicago. Track elevation and electrification would involve an investment of $5,000 per mile for every mile of line owned by all the railways entering that city. Certainly, no such enormous burden should be imposed on the railways directly and on the commerce of the country as a whole, or on that of Chicago alone, except for reasons of the greatest potency. That the entire burden, if imposed, would have to be borne by commerce is clear, since the laws do not permit the city to meet any part of the expenditure by taxation.

As already indicated, the commission finds the project "financially impracticable." Each road would have to raise its share of the necessary capital. But while some roads would have no trouble in doing so, others would find it impossible. There are a number of lines running into Chicago which are very weak financially. Three of the important lines are in the hands of receivers, and another has just emerged from bankruptcy. Such roads find it very hard to get new capital, even for improvements which might yield a good return on the investment. But electrification is not in this class of improvements. On most roads it would cause an increase in fixed charges greatly exceeding the savings in operating expenses. Weak roads would therefore find it impossible to raise new capital for this purpose. There are a number of switching and terminal lines which lie almost entirely within the Chicago district. They would be unable to offset by increase in their net earnings outside of Chicago any part of the increase in fixed charges which electrification would cause.

The commission specifically says that its conclusions relate only to electrification of all the steam railroad terminals of Chicago. They have no application to the electrification of the suburban lines of individual railways. It is contended in some quarters that certain suburban lines should be operated by electricity, both for the good of the city and because the roads would benefit by the increase in traffic, and reductions in operating expenses, it is claimed, would result. This argument may have some validity, but the question as to whether it is desirable from the railroad standpoint for certain suburban lines to be electrified is one which their officers are competent to determine. There can be no question regarding the desirability and probability of an increase in electrification of steam railroads; but the problems to be solved are numerous, and they will not be solved by action on the part of public authorities, who do not possess the expert knowledge necessary for guidance in such matters, or who arbitrarily refuse to give full consideration to all the interests affected.

INCREASING EFFICIENCY AS INDICATED BY LARGER TRAIN LOADS

WHILE the business depression and other unfavorable conditions during the past few years have compelled the railroads to practice a degree of economy that undoubtedly has been too drastic for their best interests and for those of the public they serve, the necessities of the situation have had a salutary effect in one respect in stimulating efforts toward the greatest efficiency.

In the fiscal year 1915 the gross earnings of the railroads of the United States were $163,000,000 less than in 1914, but the roads succeeded in reducing their operating expenses by $186,000,000. Nearly half of the reduction was in maintenance expenditures, and much of it represents deferred maintenance that must be made up some time. A little over half of the saving, however, was in transportation expenses, which were reduced 9 per cent per mile. This represents a real saving, which was accomplished by more efficient methods of operation.

One of the most effective ways of improving railroad efficiency is to increase the number of tons of freight per train. Out of 35 important roads whose annual reports for the fiscal year 1915 are available, 28 show increases in their tonnage per freight train, as compared with the previous year, while only 7 show decreases, the average gain for these roads being 22 tons per train, or from an average of 482 tons in 1914 to 504 tons in 1915. The most remarkable feature of this showing is that it was accomplished in a year when most roads had decreases in freight traffic, and when, therefore, the difficulty of increasing train loads was especially great. The list of roads, with their average tons per freight train for 1915 and 1914, is as follows:

Road	Average tons per train 1915	1914	Road	Average tons per train 1915	1914
A., T. & S. F.	442	420	G. N.*	650	663
B. & O.*	692	645	H. V.	1,068	1,036
B. & M.*	333	279	I. C.	523	488
B., R. & P.*	707	694	K. C. S.	582	545
C. P.	463	464	L. V.	643	645
Cent. of Ga.*	360	347	L. & N.	347	297
C. & O.	962	927	M., St. P. & S. S. M.	396	404
C. & A.	454	479	M. P.*	417	389
C. & N. W.	443	411	N. C. & St. L.	215	206
C., B. & Q.	492	478	N. Y., N. H. & H.	333	304
C. G. W.	574	512	N. & W.*	841	802
C., M. & St. P.	459	454	N. P.*	567	573
C., R. I. & P.	380	362	P. M.*	498	459
C., St. P., M. & O.	360	331	St. L. & S. F.	378	351
C., H. & D.	649	636	St. L. S. W.	345	338
C. & S.	308	291	Southern	382	339
D. & R. G.	433	390	S. P.	464	471
D., T. & I.	477	439	Totals	17,637	16,869
			Average	504	482

* Revenue freight only.

An especially noteworthy feature of the improvement in 1915 is the fact that the general average was pulled down by many branch lines where but one train a day is run, particularly in the west, because it was impossible on such lines to reduce train mileage to offset the lighter tonnage, and the increases shown for the systems represent a much greater proportionate improvement on the busier divisions.

Handling a greater tonnage without a proportionate increase in the number of trains has been for many years one of the most vital factors in enabling the railroads of the United States to stand as well as they have an almost continuous reduction of rates in connection with constantly increasing expenses. An examination of their trainload figures reveals an amazing record of increased efficiency. In 1894 the average number of tons per freight train was 179.8, in 1904 it was 307.8 and in 1914 it had increased to 451.8, a gain in 20 years of 152 per cent, and in 10 years of 47 per cent. During most of these years the volume of traffic was increasing, and the only way by which it

could be handled with the available facilities was by increasing the trainload. When traffic declined in 1908, as compared with 1907, the trainload also declined from 357 to 352 tons. With that exception it has increased in every year since 1904. But in 1914, as compared with 1913, and in 1915 as compared with 1914, the traffic declined. The fact that the roads have gone on increasing their train tonnage during these years makes a remarkable showing and indicates clearly the great exertions made by the operating officers to reduce expenses.

In 1894 the railroads of the United States hauled 80,335,000,000 tons of freight one mile and in 1914 a total of 288,319,000,000 tons one mile. This is an increase of 259 per cent; but it was handled with only 42 per cent more train miles. The 1914 ton mileage also represents an increase of 65 per cent over that of 1904, which was 174,522,000, but it required an increase of only 12.5 per cent in train miles. In other words, to have handled the traffic of 1914 with the average train of 1894 would have required running 1,600,000,000 train miles instead of 638,000,000. The saving, 962,000,000 train miles, is 150 per cent of the train miles actually run in 1914.

The average cost of operation per train mile for all trains as shown by the Interstate Commerce Commission reports, was $1.31 in 1904 and $1.77 in 1914. The cost per train mile in freight service is considerably higher than the average for both freight and passenger service. While it is impossible to state exactly the average cost of operation for a freight train mile it is evident that a saving of 962,000,000 train miles means a saving of hundreds of millions of dollars annually in operating expenses. When compared with this actual accomplishment, Louis D. Brandeis' "scientific management" schemes for saving the railroads a million dollars a day pale into insignificance. Even the average loading of 307.8 tons in 1904 would have required running 936,000,000 train miles in 1914, instead of the 638,000,000 actually run, so that the saving as compared with 10 years before was 298,000,000 train miles. This was accomplished both by using larger cars, by loading more tons of freight into a car and by using more cars per train. The average number of loaded cars per train was increased from 17.4 in 1904 to 21.4 in 1914, while the average number of tons per loaded car was increased from 17.7 to 21.1.

The amount of the *increase* in tons per train from 1904 to 1914 alone is greater than the total average tons per train for the railways in most other countries. Outside of Canada and Mexico, Germany is the only country in the world whose railways come anywhere near ours in train loading. The figures for some of the principal countries for 1912 are as follows: Canada, 325.3; Germany, 240.4; Mexico, 224.1; India, 184.4; Austria, 180.5; Roumania, 143.7; France, 141.7; Holland, 137.1; Switzerland, 132.8; Japan, 110.7; South Australia, 109.6.

The heavy train loading is the principal element in making possible the low freight rates charged and high wages paid in the United States as compared with foreign countries. The operating expenses for a heavy train are somewhat higher than for a lighter train, because the engine crews receive higher wages on the larger engines, the fuel consumption is greater, the trains often require a longer time in getting over a division, and the increased supervision necessary to secure the most economical loading adds something to the payrolls. These increases per train, however, are more than offset by the reduction in the number of trains run. It is almost true that revenues are measured by ton miles and expenses by train miles.

In view of this showing of savings in operating expenses, the question naturally arises as to why so many railways are complaining that they are in a bad plight financially. This is due partly to the fact that the economy in operation secured by increasing trainloads is partly offset by the increase in investment and fixed charges that it is necessary to incur in order to effect this economy. The investment in reductions in grades and curvature, in heavier rails, more powerful locomotives and longer sidings and passing and yard tracks has greatly increased total interest charges. But the greatest increase in outgo has been caused by the heavy advances in wages. The railroads in 1914 paid over $300,000,000 more in compensation to their employees than they would have paid on the basis of the wages in effect in 1904. Without the increase in the average freight trainload, with the consequent savings effected, most of the railways, in the absence of large increases in rates, would have been in the hands of receivers. On many roads the increases in wages, fixed charges and other expenses actually have come faster than trainloads could be increased, and other economies could be effected, and the results have been disastrous.

MISSOURI, KANSAS & TEXAS

THE Missouri, Kansas & Texas has completed the valuation of its property in Oklahoma and has made an estimate of the valuation in Missouri and Kansas based on the Oklahoma valuation. This estimate places the original cost, with additions and betterments, of the system in the three states, exclusive of Texas, at $58,370 per mile (the company operates 1,660 miles in these three states). The cost of reproduction new is placed at $68,604 per mile. In the fiscal year ended June 30, 1915, operating income amounted to $8,603,000. This would be 7 per cent on a capitalization of $34,000 per mile on the total 3,604 miles of railroad operated.

In 1915 operating income was the largest in the history of the company. The operating ratio in 1915 was 69.81 per cent, the first time this ratio has been below 70 since 1907, and in that year there was allowed for maintenance only 11.13 per cent of the total revenue as against 13.92 per cent in 1915. The operating ratio in 1914 was 72.77 per cent, but the actual economies effected are greater than would be shown by the comparison between 72.77 and 69.81, because the average revenue per ton per mile in 1915 was 9.9 mills as against 10.9 mills in 1914, a decrease of 9.2 per cent. The revenue per passenger per mile was less than half of one per cent greater in 1915 than in 1914, being 2.26 cents. The average revenue trainload in 1915 was 310 tons, comparing with 268 tons in 1914, an increase of 42 tons, or 15.7 per cent.

Total operating revenues in 1915 amounted to $32,899,000, an increase of $981,000. The freight revenue was $22,397,000, an increase of $2,169,000 over the previous year, and the passenger revenue was $8,096,000, or $1,009,000 less than in 1914. The total tonnage of revenue freight in 1915 was 10,135,000, an increase as compared with the previous year of 1,013,000 tons. The total ton mileage of revenue freight was 2,263,782,000, an increase of 413,190,000 ton-miles, or 22.3 per cent. The mileage run by revenue freight locomotives was 7,172,000, an increase of 222,000, or 3.2 per cent.

The total number of passengers carried was 6,556,000, a decrease of 779,000, and the passenger mileage was 358,631,000, a decrease of 45,403,000, or 11.2 per cent. Passenger-train mileage was 7,353,000, a decrease of 405,000 train-miles, or 5.2 per cent.

Assuming that the cost per passenger-train mile was approximately the same in 1915 as in 1914, which is a fairly safe assumption, it is fair to arbitrarily make a guess at a figure for the total operating expenses, including taxes and general expenses per train-mile, for passenger service and to assign this figure to the passenger service for both years so as to get some rough figure by which to measure the reduction in expenses per ton-mile of freight. Taking $1.25 as the average cost per passenger-train mile, the total passenger expenses in 1915 would have been $9,201,250, and in 1914, $9,697,500.

In 1915 over 22 per cent more tons were carried one mile than in 1914, at a cost in 1915 less by over $200,000 than in 1914. There are four principal factors which have brought about this result. In 1914 operating conditions were extraordinarily bad, and while there were floods in 1915 also, conditions were not quite so bad as in the previous year. The organization which has been built up since the new management took hold of the property five years ago has been showing from year to year greater facility in the economical operation of the property. In July, 1914, 30 new Mikado locomotives were placed

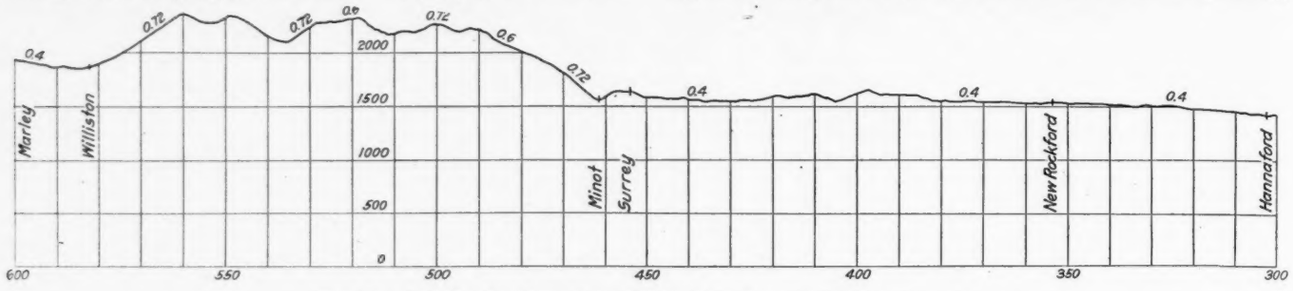
in service. In 1915 for the first time the Missouri, Kansas & Texas secured a substantial tonnage of crude petroleum, giving it a traffic which could be moved in heavy tonnage trains northbound. Each one of these factors is important, although the first one mentioned is probably of much the least importance and the crude petroleum traffic possibly the most interesting. In 1914, 199,000 tons of crude petroleum was hauled. This was only a little over 2.18 per cent of the total traffic handled. In 1915, 1,056,000 tons of crude petroleum was hauled, or 10.42 per cent of the total tonnage in that year. There was a large increase in the tonnage of grain carried, the total in 1915 amounting to 2,499,000 tons, an increase of 471,000 tons over the previous year. This was the result of large crops and of extraordinarily large shipments of grain for export via gulf ports on account of the war. The tonnage of coal in 1915 amounted to 1,571,000 tons, a decrease of 400,000 tons as compared with the previous year, the decrease being due to general business depression.

As previously mentioned, total operating expenses amounted to $22,968,000, a decrease of 1 per cent. There was spent on maintenance of way $4,503,000, or but $72,000 less than in the previous year, and on maintenance of equipment $4,579,000, which was $645,000 more than in the previous year. When the present management took the Missouri, Kansas & Texas there was a large amount of deferred maintenance, of equipment especially. In 1915, $2,508 was spent for repairs per locomotive, $658 per passenger-train car and $60 per freight-train car. At the end of the year 19.3 per cent of the locomotives owned and 6.73 per cent of the freight cars owned were undergoing or awaiting repairs. Since the close of the fiscal year the equipment has been brought up to a satisfactory standard for the first time in a number of years.

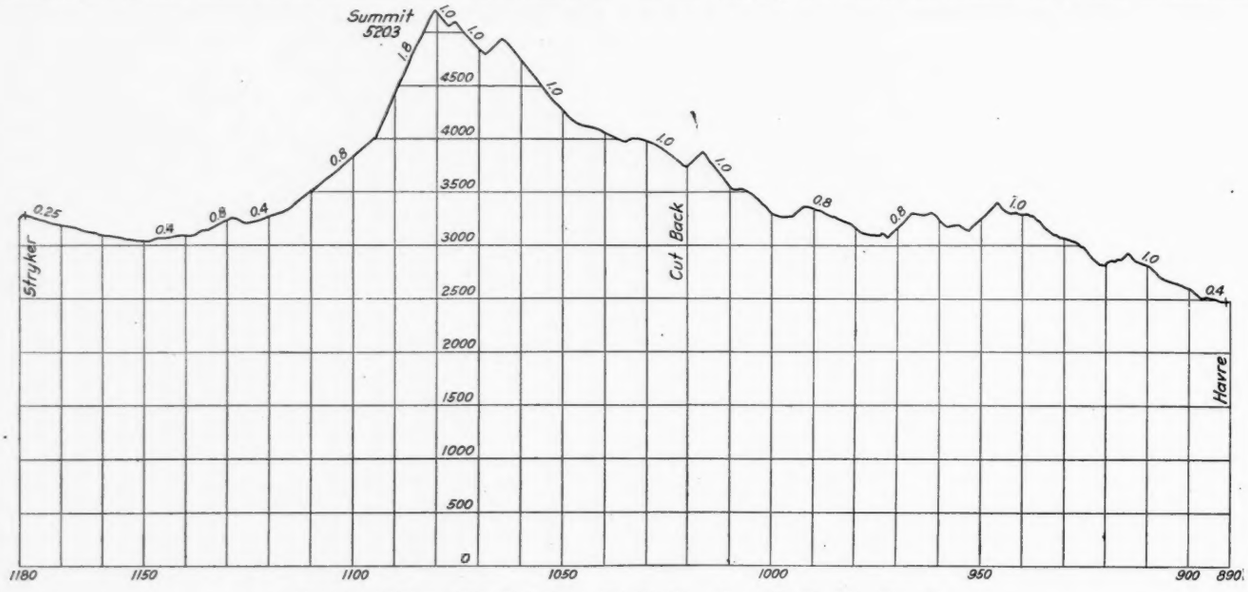
During the year under review, the company spent $1,494,000 for additions and betterments, exclusive of additions to equipment. Ballast and track laying and surfacing were the most important items of betterment expenditures. There was also

Missouri, Kansas & Texas

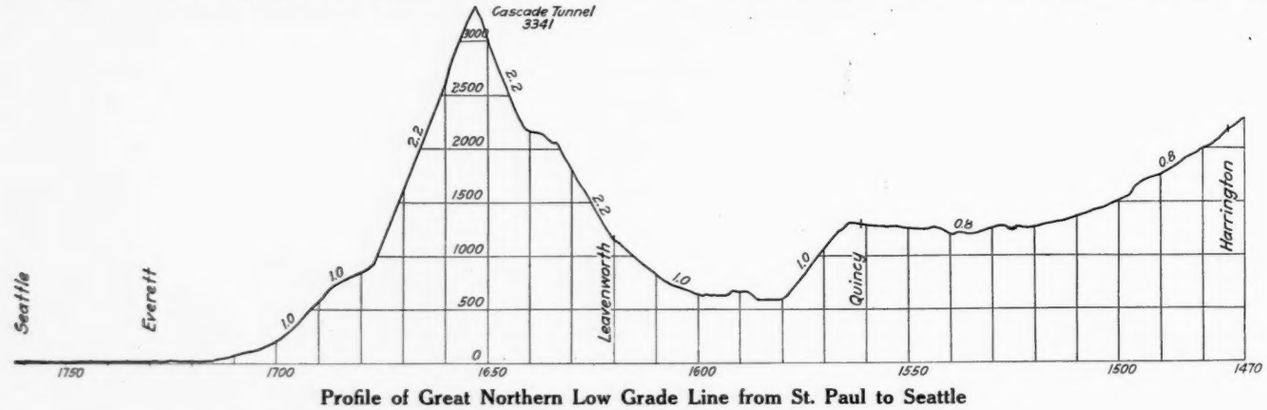
$165,000 spent for land for transportation purposes. During the year $1,062,000 was spent for new equipment, and equipment having a cost of $713,000 was retired. A $646,000 issue of Missouri, Kansas & Texas of Texas equipment trust 5 per cent notes was sold, and various issues of notes and bonds were retired or bought for the sinking fund, making a net decrease in the outstanding funded debt of $379,000. On June 30 there was a total of $1,039,000 cash, which included $497,000 cash deposited to pay interest, and there was $2,810,000 loans and bills payable. After paying expenses, taxes, rentals and all interest charges, the Missouri, Kansas & Texas had a net income available for dividends of $1,475,00, an increase as compared with the previous year of $936,000. No dividends were paid and this amount was carried to the credit of profit and loss.



Profile of Great Northern Low Grade Line from St. Paul to Seattle



Profile of Great Northern Low Grade Line from St. Paul to Seattle

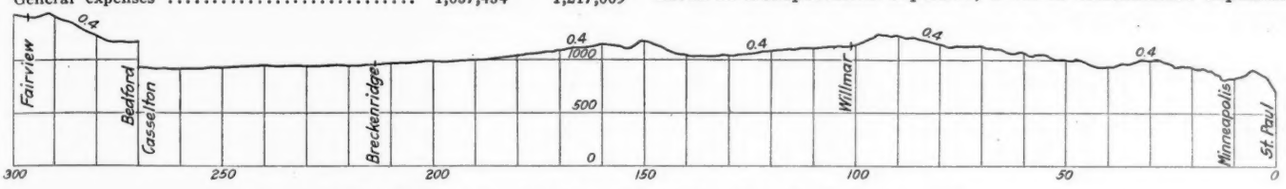


Profile of Great Northern Low Grade Line from St. Paul to Seattle

The causes which led up to the receivership of the Missouri, Kansas & Texas on September 26 have been discussed previously in these columns. The annual report which has been issued emphasizes the point which was made in that discussion, namely, that the receivership was not because the results of operation of the property were bad, but because of special circumstances beyond the control of the management. The Missouri, Kansas & Texas is working its problems out. Its revenue freight traffic load was uneconomically low. It has been increased by 38 per cent since 1911. Its relations with Texas have been friendly where they were previously hostile. The company has secured strong banking support, and what is now essential is that it should get a square deal from the state railroad commissions and state legislatures.

The following table shows the principal figures for operation in 1915 as compared with 1914:

	1915	1914
Average mileage operated	3,865	3,825
Freight revenue	$22,397,364	$20,228,337
Passenger revenue	8,096,063	9,105,242
Total operating revenues	32,898,759	31,917,924
Maintenance of way and structures	4,502,567	4,574,726
Maintenance of equipment	4,579,464	3,934,119
Traffic expenses	657,215	737,766
Transportation expenses	12,080,328	12,408,688
Miscellaneous expenses	267,515	504,713
General expenses	1,037,434	1,217,009



Profile of Great Northern Low Grade Line from St. Paul to Seattle

Transportation for investment-Cr.	186,932	150,188
Total operating expenses	22,967,592	23,226,832
Taxes	1,327,871	1,499,521
Operating income *	8,603,296	7,299,548
Gross income	8,818,130	7,516,927
Net income	1,474,985	539,227
Dividends	.....	261,429
Surplus	1,474,985	277,798

* The figures for operating income, gross income, etc., are not absolutely accurately comparable because of changed rules regarding accounting put into effect by the Interstate Commerce Commission, but are approximately comparable.

GREAT NORTHERN

THE Great Northern is one of the few railroads in North America that could cut maintenance of way expenses 36 per cent and maintenance of equipment 31 per cent and not lay itself open to the suspicion of inadequate maintenance. This it did in 1915. The Great Northern, like the Southern Pacific, has never been through a receivership; it has never had to live on its own fat, if the expression may be permitted. On the other hand, there has been invested in the property approximately $80,000,000*

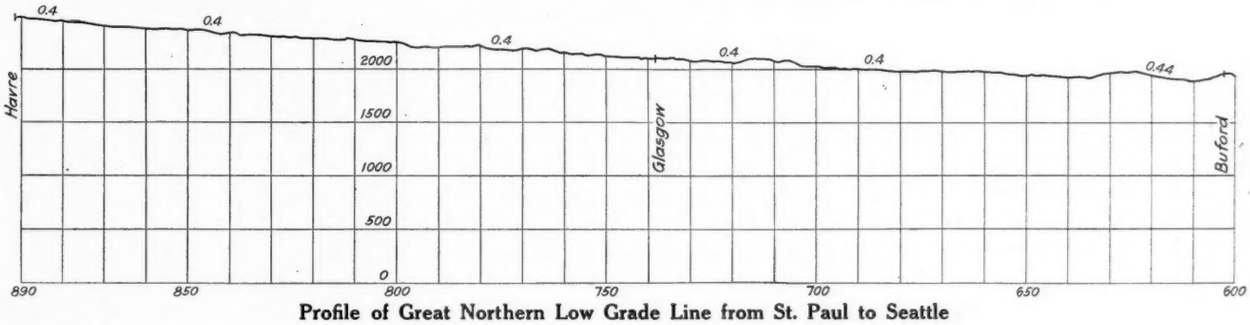
* This is arrived at by taking the sum of the fund for permanent improvements and betterments, the cost of additions and betterments made and paid for from that fund, and the profit and loss credit, and subtracting from it the cash on hand.

against which no securities have been issued. In 1915 apparently the Great Northern was under no necessity of making an uneconomically drastic cut in maintenance appropriations. Total operating revenues in the fiscal year ended June 30, 1915, amounted to $67,163,000, a decrease as compared with the previous year of $9,692,000, or 13 per cent. There was $3,194,000 saved in transportation expenses; a cut in maintenance expenses exactly in proportion to the falling off in revenue would have saved an additional $3,000,000; the company had $3,800,000 surplus above its dividend requirements; or a total of nearly $10,000,000, while loss in revenue was but $9,692,000.

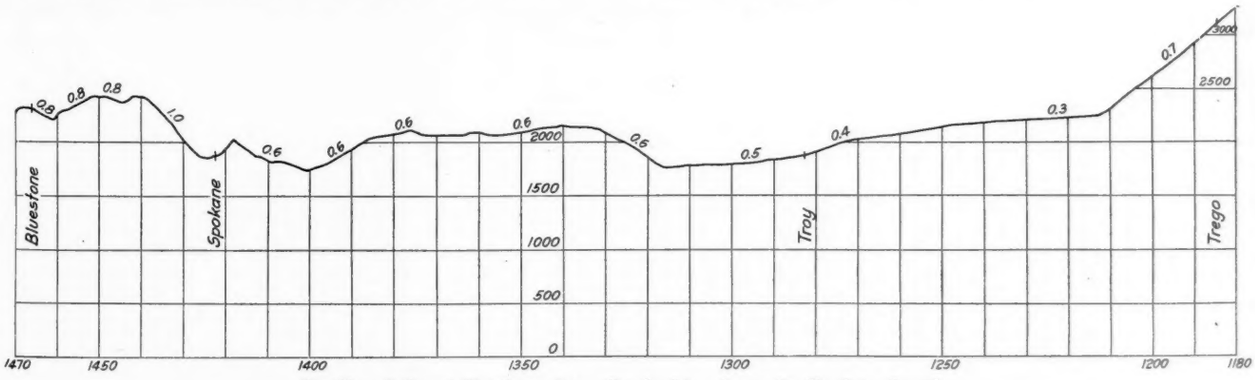
In concluding his report in 1914, President Hill said: "The company's roadbed, tracks and equipment have been fully maintained and greatly improved. The season's track work was finished by the end of July, a large amount of delayed bridge work was completed, heavy shop forces, maintained during last winter, have been materially decreased, so that, for at least the first half of the coming fiscal year, the expenses of maintenance and betterments should be greatly reduced."

For a great many years the Great Northern has been working toward certain standards, both in trainloading and in maintenance. These standards in maintenance were reached, apparently, in 1914. It was known, as will be seen from Mr. Hill's statement, that it would be much cheaper to maintain these standards than it had been to attain them. How much cheaper it was, however, possibly came as a surprise even to the Great Northern management. This is the real explanation of the cut in maintenance figures.

In the fiscal year ended June 30, 1915, it would appear from



Profile of Great Northern Low Grade Line from St. Paul to Seattle



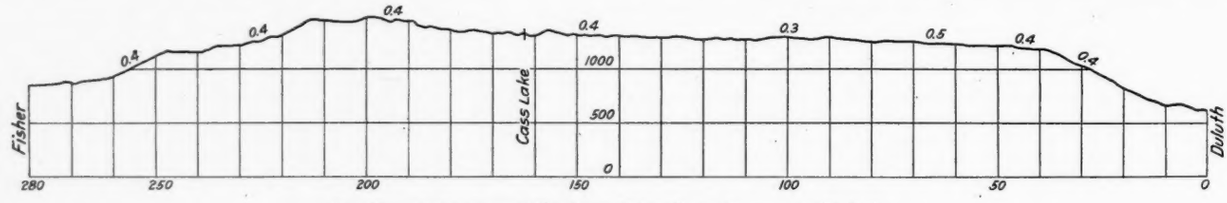
Profile of Great Northern Low Grade Line from St. Paul to Seattle

The profile from St. Paul to Surrey is via the new Surrey line, which gives better grades than the old St. Paul line via Fargo. The mileage is only approximately correct, nothing being allowed for a short connection between Castleton and Bedford, for which a profile was not available. The portion of the old main line between Surrey and Grand Forks is shown on the Duluth-Surrey profile on the following page.

the railroad annual reports which have appeared so far, that there have been larger economies made in transportation expenses by railroads generally than in any year in the last decade. It has only been within the last few years that conditions on many roads were thought to permit the attention being given to heavier trainloading that has been the fundamental principle of Hill railroad operation. The comparison for many roads therefore between 1914 and 1915 is more favorable than it would have been had they set a "Hill" standard in past years. On the other hand, it is possibly the results obtained on the Great Northern in 1915 that made James J. Hill remark recently that he believed that if he were starting over again he would set the peg for trainloading higher than he did.

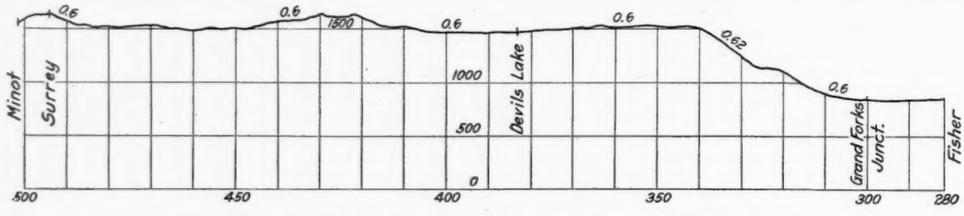
The ton mileage of freight on the Great Northern in 1915 was 6,598,341,000, a decrease as compared with the previous year of 17.80 per cent. There was a loss in iron ore tonnage of 4,341,000, or 31.57 per cent, and a loss in the copper ore tonnage of 1,398,000 tons, or 71.57 per cent. These, of course, are the heavy loading commodities. The average trainload in 1915 was 650 tons and in 1914, 663 tons. This is a decrease of less than 2 per cent. It is often pointed out in connection with the Great Northern's remarkably heavy trainload that it has a very large ore business moving from the Missabe range to Duluth. Grades and traffic conditions here permit of enormous trainloads, and when this tonnage is included in the general average make a comparison between the Great Northern and other northwestern transcontinental roads not entirely accurate. Excluding entirely the iron ore tonnage handled from the range to the head of the lakes, the average revenue trainload on the Great Northern in 1915 was 556 tons. The average trainload of revenue freight from and to the range was 3,174 tons. This is based on ore train movement both ways, that is, a combination of light and empty ore train mileage. It will readily be seen how much of a handicap in the average trainload figures a decrease of 32 per cent in ore tonnage was, and it is a high compliment to the management that average trainloading fell off less than 2 per cent.

The Great Northern has a mass of branch lines which necessitate local freights and light trainloads, but so thoroughly has the principle of heavy trainloading been inculcated in the organization that, exclusive of ore tonnage, the trainload was 556 tons. The heavy movement of traffic is eastbound. Through freight trains are run from Seattle to St. Paul with a full tonnage rating, including equipment behind the drawbar, of over 3,000 tons. There is electric service on the 2.2 grade shown in the accompanying profile up to and through Cascade tunnel, and helper service on the .8 and 1.8 grade up to Summit. At one point only is it necessary to fill out and this is at Cut Bank, where there is ample opportunity to use cars brought in from the line running to Great Falls and Billings. This continuous movement of through trains from the Pacific ocean to St. Paul, with a minimum of service on branch lines and with an insistence on heavy carloading, is the explanation of the Great Northern's success. The vast sums of money which have been invested in the property have been spent with the single purpose of making a transportation machine which would perform its functions at the least possible cost for repairs, renewals or operation. In the carrying out of this scheme, complicated details have been avoided through the adoption of simple standards, and local conditions have been made to adjust themselves to these standards rather than compelling the modification or complication of the standards. An analogous development has taken place in the organization. At least four of the superintendents now on the Great Northern began railroad work in the section house.



Profile of the Great Northern Line from Surrey to Duluth

This brief resumé of the Great Northern's history is by way of saying that when the operations in 1915 compare very favorably with the previous year, a very high standard of comparison is being used. During 1915 the company spent a total of $3,145,000 on additions and betterments, exclusive of additions to equipment. The total spent for equipment was $1,771,000. A very liberal policy has been pursued toward charges for depreciation. The total to the credit of this account on June 30, 1915, was $26,542,000, and when the annual report says that this represents "full depreciation to that date (June 30, 1915), on all equipment then in service," the statement may be taken at its full face value. The company had on hand, as was previously mentioned, at the end of the year $11,591,000 cash and $10,365,000 bills receivable, with no notes and bills payable, and total current liabilities of $6,884,000, which included the unpaid coupons due July 1, 1915, amounting to approximately $2,769,000.



Profile of the Great Northern Line from Surrey to Duluth

The ore tonnage from the iron range passes over only about 75 miles of the eastern end of this line.

The following table shows the principal figures for operation in 1915 as compared with 1914:

	1915	1914
Average mileage operated	8,061	7,781
Freight revenue	$47,147,314	$55,084,925
Passenger revenue	13,164,857	15,224,463
Total operating revenues	67,162,858	76,854,938
Maint. of way and structures	8,270,354	12,831,671
Maintenance of equipment	7,152,302	10,322,198
Traffic expenses	1,167,536	1,360,564
Transportation expenses	18,261,030	21,454,754
General expenses	1,258,755	1,127,440
Miscellaneous expenses	815,184	673,147
Transportation for investment—Cr.	96,886	.....
Total operating expenses	36,828,275	47,769,774
Taxes	4,629,668	4,792,478
Operating income	25,704,915	24,292,686
Gross income	28,015,114	27,776,452
Net income	20,618,270	20,453,551
Dividends	16,796,857	15,063,048
Appropriated to "fund for permanent improvements and betterments"	1,000,000	1,000,000
Surplus	2,096,762	3,311,572

Chicago Association of Commerce Smoke-Abatement Report

The Electrification of Railway Terminals Is Considered Technically Feasible but Financially Impracticable

The complete electrification of the Chicago railroad terminals as a means of abating smoke is technically practical, but financially impracticable. This is the finding of the Chicago Association of Commerce Committee of Investigation on Smoke-Abatement and Electrification of Railway Terminals, which has been studying the problem since early in 1911. The committee, in addition, holds that the elimination of steam locomotives alone would produce a hardly perceptible betterment of the Chicago atmosphere, and urges the appointment of a permanent Municipal Pure Air Commission which both through instruction and coercion shall reduce all sources of air pollution to a minimum.

The association committee, as a result of its painstaking investigations, reaches the following conclusions:

That the minimum cost of electrification as a means in smoke-abatement would be $178,127,230

That the more probable cost, due to the necessity for improvements and rearrangements, which would be precipitated by electrification, would be $274,440,630

That the least net annual operating deficit produced by electrification would be $14,609,743

That Chicago, under the state constitution, cannot aid in meeting this expense.

That an arbitrary or tax on terminal traffic to support the capital for electrification would constitute a burden upon the business interests of Chicago.

That the cost would be so heavy that no court would uphold an electrification ordinance.

That the Chicago electrification would equal the combined electrifications of the whole world, would involve problems never heretofore met, and would be the first ever undertaken for air betterment where terminals were adequate from an operating viewpoint.

That before the steam locomotive is eliminated pollution must first be reduced to a minimum from the three more damaging services, high-pressure steam plants, metallurgical and other manufacturing furnaces and domestic fires.

That the steam locomotive stands third among smoke-producing services, using but 12 per cent of the fuel consumed, and that its elimination would reduce the gaseous pollution of the air only 5 per cent and the solid pollution less than 4 per cent.

That electrification, hydro-electric and other long-distance transmission being inapplicable, would add power-house smoke in quantities sufficient to offset much of the gain through elimination of locomotive smoke.

That suburban passenger services, such as those of the Illinois Central and other roads, produce but 1.54 per cent of the total visible smoke, and 1.97 per cent of all the dust and cinders.

That electrification would involve at least 3,476.4 miles of track.

That electrification would subtract only 1,291,282 tons of coal from the total of 21,208,886 tons now consumed annually in the city.

That all smoke regulation in Chicago and elsewhere has erred in confining itself to the visible aspects of smoke, whereas the really harmful factors are the invisible gases and the solids of combustion, sulphurous gas and mineral dust in particular.

That, despite the fact that Chicago burns more coal annually than any other large city—eight tons per capita as against four for Manchester and one and one-half for Berlin—its air is better than that of most large cities.

That, in Chicago air, the products of combustion constitute only two-thirds the total pollution, the other third being due to avoidable and unavoidable dirt from the general activities of the city and from poor municipal housekeeping.

PRACTICABILITY OF ELECTRIFICATION

As regards the financial practicability of electrification the committee submits these findings:

"The complete electrification of the railroad terminals of Chicago as a betterment to be brought about by the railroads through the investment of free capital is, under present-day conditions, financially impracticable.

"The financial practibility, under present-day conditions, of electrification as it might be applied to individual roads or to a single service of individual roads, is a matter which has not been investigated by the committee and concerning which no opinion is expressed.

"The credit of the individual railroads, the properties of which make up the Chicago railroad terminals, differs greatly. Some have high credit and could secure funds for almost any project which their managements might care to propose; others must prove the profitable character of a particular project before underwriters would consider the placement of their securities; others would find it difficult to borrow on reasonable terms even if the particular project for which the funds are sought promises some return; and still others are in the hands of receivers, their administrative function being performed by the courts. These facts cannot be overlooked in estimating what portion of the potential credit of the railroads is available for the purpose of electrification.

"Certain railroads making up the Chicago terminals operate entirely within the prescribed zone, while for others the great predominance of traffic lies outside the terminal limits. There is more to this contrast than is implied by the fact that some of the roads involved are switching roads while others are long-haul freight and passenger roads. Complete electrification, from a financial point of view, would affect but a relatively small part of the fixed investments of some roads, while for others it would require practically the rebuilding of the property.

"Electrification is a matter which may present greater advantages in connection with certain classes of service than with other classes; for example, the electrification of a railroad having a large suburban business would be more effective in developing opinion favorable to the railroad concerned than the electrification of a road the activities of which are wholly those of freight switching yards. A few only depend upon passenger traffic within the city limits for any considerable amount of their revenue. A larger number derive passenger revenue within the terminals from the movement of through passengers only; while other roads perform little passenger service or no passenger service at all.

"The extent to which individual railroads have recently made large capital expenditures for terminal improvements, track elevation and enlargement of facilities in Chicago, and the extent to which they are committed to further expenditure for these purposes, must have a material bearing on their ability to make expenditures for new projects."

The committee holds that the city might well be expected to share in the burden of electrification, seeing that it would be undertaken for the public benefit, but a perusal of court decisions shows that this is impossible. Moreover, the report points out that it would be impossible for the city, under present constitutional and statutory limitations, at least for some years to come, to raise the necessary funds without the issuance of bonds beyond the authorized limit.

Realizing that many public spirited citizens will not understand its decision, in the light of reports of electrifications in New York and elsewhere, the committee points out the essential differences between electrification here and those installations that have so far taken place. Nowhere in the world, has a steam

railroad been electrified to avoid the pollution of a city's atmosphere. Nowhere has a terminal been electrified when that terminal has been satisfactory from an operating standpoint. No electrification in existence, either in America or abroad, is comparable, in scope and diversity of service, with that involved in the electrification of the Chicago terminals. A wide gap exists between that which has been accomplished and that which would have to be done before local electrification would become a success.

"Some of the electrifications that have been most widely heralded as such were in fact only a subordinate, though necessary part of a greater scheme for terminal enlargement. The New York Central, the New York, New Haven & Hartford, and the Pennsylvania electrifications are not alone projects of electrification; primarily they are an essential detail of a new tunnel entry into the heart of New York City. These projects must necessarily stand upon a different basis than the Chicago proposal, where physical conditions absolutely requiring electrification are lacking and where physical conditions and the nature of the traffic would make electrification extremely difficult."

Notwithstanding the engineering difficulties that would have to be overcome in electrifying the terminals, the committee believes that these difficulties can be surmounted. Its work leads it to the conclusion that the only feasible means of electrification will be by the overhead contact system or trolley. Great obstacles exist to the installation of any system, but it is believed the trolley wire more nearly meets all demands than the third rail. The committee states its conclusions as follows:

"(1) A limited mileage of track in Chicago (approximately 1 per cent of the total) cannot be equipped with any system of contact. The electrification of this not technically feasible.

"(2) While the third-rail system of contact might be extensively used in Chicago, there are, at intervals throughout a considerable percentage of the total trackage, conditions which would make difficult the use of this form of contact. The third rail is applied with difficulty wherever special track work abounds, where street and railroad crossings occur at frequent intervals, and in switching yards. In locations where employees must be between or must cross tracks, as in freight yards, it constitutes a physical obstruction which is highly objectionable. For these reasons the third rail is not considered feasible for general use in the Chicago terminals.

"(3) The facts developed show that any form of overhead contact which can be placed high enough above the rail to give the clearance necessary to permit men to ride and perform necessary duties on the tops of freight cars, is not objectionable from a technical point of view. The application of an overhead contact system to the terminals of Chicago will, however, require the contact wire to be lowered in many places in order that it may pass under structures presenting minimum clearance. The great number of points at which the contact wire must be lowered will require the installation of many warning devices, or the enforcement of rigid rules governing the presence of trainmen on tops of cars."

AIR POLLUTION

The study of atmospheric pollution carried on by the committee is said to be by far the most extensive and scientific ever attempted. All the committee's figures, both on smoke and on electrification, are for the year 1912. The total annual per capita consumption of coal in the city limits was 7.7 tons. The average square-mile consumption of coal within the city limits was 10,797 tons for steam locomotives as against 79,436 tons for all other services combined. In the industrial centers and the heavily populated districts the steam locomotive coal consumption and smoke production is small when compared with the total volume for all sources. In outlying districts where the population is small and where there is no grouping of industries, the steam locomotive sometimes becomes the greatest smoke producer. In only 4 out of the 27 districts in which the area under consideration was divided do steam locomotives use more than half the total fuel consumed, and these districts are sparsely populated and have very limited smoke-producing services other than smoke from residence chimneys.

High-pressure steam power and heating plants are the principal smoke producers, metallurgical furnaces and other similar manufacturing fires come second, steam locomotives third, and low-pressure steam and other heating plants (domestic fires) fourth. Metallurgical furnaces and other similar manufacturing fires were found guilty of producing 64.26 per cent of all the solids due to combustion, which constitute two-thirds of the total solid pollution of Chicago air. High-pressure steam plants were found to rank second, with a production of 19.34 per cent, low-pressure steam and other domestic fires with 8.6 per cent and steam locomotives with 7.47 per cent, giving them fourth place.

High-pressure steam stationary power and heating plants consume 41.7 per cent of the total fuel used in the city. They are responsible for 44.5 per cent of the visible smoke, and for 19.34 per cent of the total solids, ranking second in this particular. They are responsible for 45 per cent of the total polluting gases of combustion and rank first in this division.

Low-pressure steam and other heating plants (domestic fires) consume 23.63 per cent of the city's coal. They are responsible for 3.93 per cent of the visible smoke, for 8.60 per cent of the solids in smoke and for .23 per cent of the total gases of combustion. In connection with their solid constituents these fires are responsible for 57 per cent of the total hydro-carbons or sooty materials, which makes their smoke the most damaging of any to clothing and similar articles.

The steam locomotive was ascertained to hold fourth place as a coal-consuming service. Of the total consumed, however, 98 per cent is bituminous, practically all of which comes from the fields of Illinois and Indiana. The steam locomotive "gets in bad" as its smoke is rather highly visible because, being emitted near the ground, the public gets the full benefit of the sulphurous fumes and because the cinders emitted, being heavy, fall close to the right of way, making somewhat intensive local pollution but adding little to the general dust of the air. The following is a summing up of the contribution of locomotives, to the smoke nuisance:

"Locomotives in suburban passenger service contribute 1.54 per cent of the visible smoke, 1.97 per cent of the dust and cinders of smoke, and 0.74 per cent of the polluting gases of smoke discharged annually into the atmosphere of Chicago.

"Locomotives in through passenger service contribute 2.07 per cent of the visible smoke, 1.80 per cent of the dust and cinders of smoke, and 0.89 per cent of the polluting gases.

"Locomotives in all passenger services combined, including suburban passenger, through passenger and passenger transfer, contribute 3.80 per cent of the visible smoke, 3.81 per cent of the dust and cinders of smoke, and 1.73 per cent of the polluting gases.

"Locomotives in road freight service contribute 2.01 per cent of the visible smoke, 1.18 per cent of the dust and cinders of smoke, and 0.66 per cent of the polluting gases.

"Locomotives in yard freight service contribute 10.25 per cent of the visible smoke, 1.73 per cent of the dust and cinders of smoke, and 5.17 per cent of the polluting gases.

"Locomotives in all freight services, including road freight, yard freight and freight transfer services, contribute 16.85 per cent of the visible smoke, 3.34 per cent of the dust and cinders of smoke, and 7.57 per cent of the polluting gases."

As a result of its investigation into air pollution the committee finds that one-third comes from sources other than combustion. The air is filled with vegetable, animal and mineral matter which rises from the various activities of the city.

"If all the fires in Chicago were stopped, dust and dirt in the atmosphere would remain. Atmospheric pollution cannot be reduced to a minimum through attention to smoke abatement alone. In order to accomplish its reduction attention must be given to all of those processes and activities of the city which give rise to dust or which deal with the collection and disposal of city dirt and waste."

STUDIES OF OTHER SYSTEMS

As a preliminary to its study of electrification the committee made an investigation into other methods of conducting transportation. It had been hoped that some type of self-propelling motor might be found, and the danger, engineering difficulty and expense of electrification be avoided. But this hope was not justified. The systems studied were the internal combustion motor with mechanical drive, electric drive, compressed air drive, hydraulic drive, and a direct-connected motor, the compressed-air motor, the hot-water motor and the electric storage-battery motor.

While it was found that progress had been made in adapting the gasolene engine to the requirements of light or special railroad service, the power requirements of heavy and diversified traffic are still beyond the gasolene-driven unit. The Diesel oil-burning marine engine has the power, but neither type is self-starting, an imperative requirement for switching work.

Much, also, had been hoped from the storage battery, but it was found to lack power, to be too expensive and to share with electrification the disadvantage of producing power-house smoke. The internal combustion motors are also smoke-producing and are regarded as adding a new hazard of operation through their fuel tanks. Compressed-air and hot-water motors were found impractical, but their use is suggested on those sections that cannot be electrified.

"There is available at this time," says the report, "no form of locomotive, carrying its own power, capable of handling the

Map of the Chicago Terminal Area Included in the Smoke-Abatement Investigation

traffic of the Chicago railroad terminals which could be substituted for the steam locomotive, and there is no prospect of the immediate development of any such locomotive."

After studying all electrifications now in exsistence or planned, both in this country and abroad, the committee finds that of the total of 15 American installations, 9 were undertaken because of operation in subways or tunnels, 1 as an experiment to test out economy in long-distance passenger service, 2 to hold suburban business, 1 was equipped for initial electric operation because of charter requirements, and 2 for the purpose of utilizing water power instead of coal.

ELECTRIFICATION ELSEWHERE

Of the foreign electrifications all English lines are classed as suburban. None conducts heavy electric locomotive service and none freight service except in a very minor degree. Practically all electric service is confined to suburban and interurban traffic handled by motor cars. In France the Orleans railway confines its electric locomotive operation to passenger trains through a subway entrance into an underground terminal. It also operates electrically a suburban motor car train service on a line connected with this terminal. The Midi electrification is, in its present stage, experimental only, and for heavy-grade lines where hydro-electric power may be substituted for steam.

In Germany no considerable heavy electric main line traction is as yet in operation; the Dessau-Bitterfeld is a short line and has been operated only in experimental service to test out apparatus and methods. The Magdeburg-Leipzig-Halle line, an important extension of which the Dessau-Bitterfeld line will form a part, when completed will represent the first German trunk line electrification, and the Lauban-Königszelt line will represent a second such electrification. Both are predicted upon the production of cheap centralized power either from very low-grade coal or from hydro-electric plants. While both of these lines will conduct a heavy electric locomotive passenger and freight service, neither will conduct a freight-switching service comparable with that in the Chicago terminals. In Switzerland the Loetschberg line and the Simplon tunnel line were electrified primarily because of tunnel operation; other Swiss electrifications are for light multiple unit train service only. All Swiss electrifications utilize cheap water power instead of the more expensive coal fuel. In Italy the Giovi with its branches is the only road which operates heavy electric service. The secondary lines in foreign countries operate a service which is entirely different from American operation, and resembles our interurban.

THE CHICAGO PROBLEM

Thirty-eight steam railroads would be involved in the Chicago project, as against 37 for the rest of the world. Of the Chicago roads 25 maintain passenger and freight service and 23 are classed as trunk lines, while 13 perform transfer or switching service only. Eight of the trunk lines have no main tracks within the city limits but operate trains into the Chicago terminals over the tracks of other companies. Twelve railroads operate wholly within the area of investigation.

It was found that the Chicago mileage would be nearly twice that of all other electrically operated mileage in America, and, exclusive of foreign light-service lines, would be about 15 per cent greater than all existing electrifications in the world. The committee's plan involves several times as much yard track mileage as do all existing American electrifications. The number of electric locomotives required would be approximately 4 times that of all now in service in America and 2½ times the number in the whole world.

Of switching service, which constitutes 59 per cent of the total locomotive mileage and presents a grave problem in that it has never been attempted electrically on a large scale, it has been ascertained that yard freight-switching services, on the basis of car-miles, is more than 65 times as great as that on all existing electrified steam roads in America.

"No similar service elsewhere is handled electrically in any considerable volume except that on the Giovi railroad of the Italian State Railways and on the New York, New Haven & Hartford in America. The latter operates, in part electrically and in part by steam locomotives, 3 freight yards having in the aggregate 72.7 miles of track, requiring about 90,000 electric locomotive-hours per year and handling about 2,500,000 car-miles per year in switching and transfer service. The freight yard traffic of the Chicago terminals aggregates approximately 3,430,000 locomotive-hours per annum and approximately 164,400,000 car-miles per annum in switching and transfer service."

In its study of air pollution the committee states that even the comparatively small reduction to be expected from electrification is made less significant when it is recollected that substantial progress in recent years has been made in reducing the smoke from locomotives in Chicago. There is every reason to believe also that the process has not yet reached its maximum. The improvement has resulted both from embellishments in locomotive design and from the exercise of greater skill in operation.

"Among the more important changes in design which have aided in smoke abatement are the enlargement of grates, which has resulted in lower rates of combustion per unit area of grate, and consequently in a reduction in the amount of solids in locomotive smoke; the adoption of the brick arch in locomotive fire-boxes, by means of which a reduction in the amount both of visible smoke and of the solid constituents of smoke has been effected; the more efficient design of draft appliances, by which the air currents stimulating the fire have been modified and smoke production diminished; the introduction of superheaters, whereby the efficiency of the locomotive as a whole has been increased, the amount of fuel required for the performance of a given service diminished and the volume of smoke diminished; and the introduction of steam jets and other appliances especially designed to diminish visible smoke.

"Meanwhile, the amount of smoke emitted within the city has been greatly reduced through the exercise of diligence and skill in the operation of locomotives. The importance given this aspect of the matter by the railroads of Chicago is to be seen in the number of smoke inspectors which they have employed.

"When, therefore, the fact is set forth that electrification will serve to reduce the amount of visible smoke entering the atmosphere of Chicago, by 20 per cent, it should not be forgotten that progress in locomotive design and practice, without electrification, has operated and will continue to operate to bring about a reduction which, if smaller than that to be effected through electrification, is nevertheless material; and when emphasis is given the fact that electrification will serve to reduce the amount of the solid constituents of smoke and the gaseous products of combustion entering the atmosphere of Chicago, by 5 per cent, it should not be forgotten that progress in locomotive design and operation can very likely be depended upon to bring about an equal reduction."

"The electric operation of Chicago's railroad terminals must depend upon the existence and operation of a steam-driven electric generating station. The conclusion has been reached that a single power-station, located near the south branch of the Chicago river in the vicinity of Ashland avenue, would satisfactorily meet all requirements. The load center, under the plan of electrification as already defined, falls within the limits of the Union Stock Yards. The location indicated is not far from this point and is such as satisfies other requirements of the problem."

The committee believes that the highest degree of efficiency in electrification can only be secured by joint procedure by all the roads. "It is inconceivable that the different railroads will undertake such a work independently. It may be argued that a course necessary in the case of one railroad may prove quite unnecessary in the case of another, and yet the fullest measure of technical success in the electrification can only be secured when individual interests and preference are subordinate to the requirements of a general plan."

The committee's plan contemplates the electrification of all track within the city limits and the conclusion of electrified

trackage on each railroad as close outside the city limits as is practical. The mileage involved by this conception may be summarized as follows:

	Miles.
1. Main track	1,475.59
2. Yard track	1,456.64
3. Industrial track owned by railroads	277.19
4. Industrial track, railroad repair track and shop track so located in streets at grade, in buildings or under structures employed in industrial processes as to require some type of self-propelling motor	37.26
Total	3,476.40

While in general the committee decided to terminate electrification at the first convenient point outside the city limits, this could not be accomplished on certain roads which conduct a suburban passenger service. It would be impracticable to operate these frequent suburban trains part way by electricity and part way by steam. It has hence been decided that certain lines must be partially electrified beyond the limit of complete electrification, to the terminals of the suburban service. Through passenger and all freight trains are to be operated by steam on the partially electrified extensions, which will be for use only by multiple-unit suburban trains.

As yet no system of electric traction has been developed which can be accepted as standard for all conditions on all railroads. If it were decided to proceed at once with the electrification of the Chicago terminals, it would be difficult for any group of men to choose a system which would not be criticized by other men as able as those upon whom the choice of the system developed.

The system selected for Chicago must be suitable not only for passenger terminals and through line work, but also for yard switching and transfer work. It must be applicable to the requirements of railroads having a heavy suburban traffic, and also to those roads conducting freight-yard and switching service. It must not only be satisfactory in its application to the terminal portion of a trunk line railroad, but it must lend itself to an indefinite extension of the limits of electrification over other and adjoining portions of the road. Obviously, the project must be regarded as too important to permit of the introduction of methods in any way questionable, or of a type of construction of untried value. Furthermore, it is not permissible to consider any methods which might serve to tide over a temporary condition anticipating the later selection of a permanent and stable system.

After obtaining complete engineering data on these three systems, the committee selected the third as cheapest and most desirable:

1—Third rail contact, direct current at 600 volts.
2—Overhead contact, direct current at 2,400 volts.
3—Overhead contact, single-phase current at 11,000 volts.

The third-rail system was given up as the least practical of the three because of the difficulties to be met. Not only would the presence of the third rail be a danger to employees in the yards and make necessary a large amount of reconstruction, but there would be trouble in operating trains, owing to the large number of gaps in the third rail due to switches, street intersection and other such obstructions. It is estimated by the committee that a total of about 75 miles of track in Chicago could not be equipped by the third-rail system. Another objection to the third rail is the fact that except in very unusual sleet storms, service through the trolley wire would not be interrupted, whereas both sleet and drifting snow furnish a serious problem with the third rail. The rail is also a danger to property and life in case of wreck.

The difficulties of trolley installation would also be great, but less, it is believed, than those attending the use of the third rail. The great trouble found is with low bridges and other structures over the tracks. A sufficient clearance to permit employees to ride on tops of cars cannot be obtained throughout the Chicago terminals.

The adoption of the overhead contact (trolley) system would permit the use of either a high-voltage direct current or an alternating current of much higher voltage. The use of the first would result in damage to property by electrolysis. The use of the second would "kill" telephone and telegraph wires adjacent to the tracks, through inductive interference. Both conditions could be remedied, though with difficulty and at considerable expense.

The committee finds that it would make no practical difference whether the roads manufactured their own electric power or purchased it from public service corporations. Electricity would, it is concluded, neither increase nor decrease the dangers of operation. Added dangers would be introduced, but compensating safety in other directions would offset these.

The committee has made an effort to arrive at the incidental advantages that would accrue to the railroads through electrification. The change would give some increased capacity in existing trackage and terminals In locations where operation under present-day conditions is congested, it would give relief, and in locations where there is at present no congestion, electrification would constitute, in effect, an enlargement of existing facilities and hence would postpone the day when additional facilities would be required.

Electrification would contribute to increased celerity and reliability in train movement. It would open the way to more intensive use of railroad property, both in this manner and by making double-decked freight and passenger terminal stations possible. It would also make possible the erection of buildings over tracks, but this value is regarded as speculative and, as a present-day asset, small. Electrification would give the roads an asset in the use of electric service beyond that required for trains. It would benefit the roads through the increased convenience and comfort of passengers and it would also give the roads whatever advantage accrued, entirely indeterminate, through the lessening of smoke.

COST OF ELECTRIFICATION

In arriving at the cost of electrification, the committee based its work on 1912 operation, extended to meet conditions if electrification were to begin in 1916 and be completed in 1922. The following accounting statement shows why the committee holds that electrification is financially impossible. The deficit on the minimum outlay of $178,127,230 would be too great:

I. ANNUAL CHARGES:		
1. Interest	$8,906,362	
2. Depreciation	7,808,278	
3. Replacement of dissipated assets	231,796	
4. Indeterminate charges		
Total charges		$16,946,436
II. ANNUAL REVENUES:		
1. Increase in net revenues	$2,336,693	
2. Indeterminate benefits		
Total credits		$2,336,693
Balance, annual deficit on investment		$14,609,743

The investigations show that electrified operation for all the railroads taken together and disregarding depreciation and interest would result in a decrease in operating expenses. Under steam operation, those accounts that would be affected one way or the other by electrification show a total of $10,934,064. Under operation by the 600-volt direct-current third-rail system, the total would be $8,442,298, with the 2,400-volt direct-current system it would be $7,355,771 and with the 11,000-volt alternating-current system it would be $7,140,495. The installation of these three systems would result in a saving in operating expenses respectively of $2,491,766, $3,578,293 and $3,793,569.

This saving, however, is in part nullified by new expenses due to the operation of stations that would have to be established at the end of electrified tracks to provide for a transfer of trains from electric to steam locomotives, and also by the waste and consequent loss due to operating over shortened steam railroad divisions, which have surrendered part of their mileage to make the new terminal electric divisions. The engineers' estimates place the added expense under the first item at $1,546,113 and the added expense under the second at $450,000. This would leave the net saving in operating expenses, to follow electrification, at $495,653 for the third-rail system, $1,582,180

for the direct-current trolley system and $1,797,456 for the alternating-current trolley system.

Following the work of the committee, a number of the Chicago railroads have made a study of the cost which would be imposed upon them in excess of those set forth by the committee. Eight of these railroads have filed with the committee the results of their investigations. The reports thus submitted have been analyzed with results which are set forth as follows:

ESTIMATES OF INDETERMINATE COSTS OF EIGHT RAILROADS

1. Costs due to an extension of the mileage of electrification over that provided by the committee's estimates	$20,872,500
2. Precipitated costs principally for track elevation	29,198,400
3. Total cost to the eight railroad corporations in excess of that necessary to electrification under the plan of the committee	50,070,900
4. The committee's estimate of the cost of electrification for the eight railroads	92,599,908
5. The excess costs, including costs due to extension of the plan and precipitated costs, in per cent of those which are covered by the committee's estimates	54.07 per cent

The committee's estimates of the net cost of electrification for all the roads of Chicago totals $178,127,230. Therefore, carrying forward the same ratio, the committee finds that the total added and precipitated costs for all the railroads would amount to $96,313,400.

Upon this basis, the total capital requirement imposed by electrification would be:

That incident to the development of a minimum plan as estimated by the committee	$178,127,230
That required to cover precipitated costs and costs due to extension of plan	96,313,400
Total	$274,440,630

For example, in fixing the limits to be observed by the Chicago, Burlington & Quincy, the committee has specified complete electrification to Hawthorne, 6.8 miles, and partial electrification to provide for suburban service only to Downers Grove, 21.3 miles from the city terminal. In reviewing the work of the committee, the officers of this road have reached the conclusion that if they were required to electrify it would be necessary to provide for the electric operation of freight service to Eola, 33.4 miles from Chicago, and for suburban service to Aurora, 37.4 miles from the city terminal.

The committee sees an ultimate and large cost due to imitation of Chicago by other cities. "It is apparent also, that Chicago's claim to the benefits of electrification are in no way different from those which might be urged by many other cities with which Chicago railroads connect; that compulsory electrification, if achieved for Chicago, may in due time be secured by all the larger cities of the country. The cost, therefore, which might be imposed upon the railroads as a whole by the compulsory electrification of Chicago's terminals would be confiscatory."

RESPONSIBILITY OF EACH SERVICE FOR SMOKE POLLUTION WITHIN CHICAGO, ON PERCENTAGE BASIS

	Visible smoke per cent	Solids of smoke per cent	Total of smoke per cent	Gaseous carbon per cent	Gaseous sulphur per cent
Steam locomotives	22.06	7.47	10.31	10.11	18.22
Steam vessels	0.74	0.33	0.60	0.55	0.45
High pressure steam stationary power and heating plants	44.49	19.34	44.96	40.68	53.70
Low pressure steam and other stationary heating plants	3.93	8.60	23.00	23.06	19.73
Gas and coke plants	0.15				
Furnaces for metallurgical, manufacturing and other processes	28.63	64.26	21.13	25.60	7.90

One-third of all air pollution is due to dirt other than that of combustion. These percentages refer to the remaining two-thirds.

The committee was appointed in March, 1911, and consisted of four members appointed by the mayor, four appointed by the railroads and nine appointed by the Chicago Association of Commerce. The late Horace G. Burt was chief engineer for the committee until May, 1913, and was succeeded by W. F. M. Goss, dean of the Engineering Department, University of Illinois. The report was submitted to the association at a dinner on Wednesday evening, December 1.

FREIGHT CONGESTION AT THE ATLANTIC SEABOARD

The congestion of freight at New York, caused primarily by the lack, during the last few weeks, of vessels to take goods to Europe and to South America, has continued to grow more acute; and a similar condition now prevails at Philadelphia and at Baltimore. In contrast with like occasions in former years, there seems to be no disposition, at any of the congested ports, to charge the serious and costly delays to lack of cars or engines or track room. In addition to ocean vessel scarcity, some shipments at New York have been delayed because the lighters which take the freight from the railroad docks to ocean vessels are all overcrowded with traffic; and certain embargoes cover not only freight for export, but also domestic shipments which must be lightered.

On Saturday last, the Delaware, Lackawanna & Western placed an embargo on eastbound freight intended for export, except shipments for which vessels had already been engaged. The company had then over 5,000 loaded freight cars on its lines waiting to be unloaded at New York.

On Monday of this week the Pennsylvania Railroad placed an embargo on all flour and lumber to be exported or lightered at New York and on grain for export through Philadelphia and Baltimore. The Baltimore & Ohio placed an embargo on all iron and steel products for export through the port of New York.

Roads which have placed no embargoes have nevertheless been making all possible efforts to have shippers in the West hold back grain and other freight destined for Europe. The quantity of wheat in elevators at New York harbor at the present time is nearly double the quantity in store at the same time last year; and the wheat from Canada now on the road, consigned to ports in the United States, mainly New York, is estimated to amount to ten million bushels.

Navigation on the Great Lakes will close November 12; and the quantity of grain now afloat at Buffalo or near there is estimated at five million bushels.

The trunk lines have filed with the Interstate Commerce Commission notices that beginning January 1 the number of days free storage to be allowed at seaboard terminals on export package and piece freight, on local bills of lading, will be 15 days instead of 30 days, whether held in railroad warehouses or in cars. On grain billed through to foreign ports, the free time has been and continues to be unlimited, when held in cars, and until 10 days after it is loaded into elevators.

Two or three firms have taken American vessels from the Pacific trade and assigned them to the New York-Europe route for grain carrying, but this relief, like that due to the shortening of free storage, will not be of benefit before January. Moreover, there is a lack of unloading facilities in European ports that foreshadows even greater delays than are now known. Europe is suffering from a serious labor shortage, which will interfere greatly with the return of vessels to this country.

At Chicago, on Saturday last, the congestion at the seaboard terminals was given as a reason for a considerable weakening in the price of wheat. At Pittsburgh a number of steel mills and blast furnaces have been curtailing production for the reason, it is said, that shipping facilities are congested and coke cannot be procured promptly.

On Tuesday of this week the presidents of the Trunk Lines, at the invitation of President Samuel Rea, of the Pennsylvania, met in New York, and after a full discussion of the railroad situation and the conditions of ocean service appointed a committee of operating officers to meet daily in New York with a view to dealing with all matters connected with the freight congestion in the mutual interest of all the roads and of the public. This committee will seek the co-operation of shippers as well as of the steamship companies and will do everything possible to avoid declaring a general embargo. Besides all the trunk line presidents there were present at the conference Theodore Voorhees, of the Philadelphia & Reading; W. G. Besler, of the

Central of New Jersey; James H. Hustis, of the Boston & Maine, and C. R. Gray, of the Western Maryland. The roads will take similar joint action at Boston, Baltimore and Philadelphia.

The New York Committe will address itself to the equalization of conditions on the different roads, those which have placed no embargoes having felt extra pressure since embargoes were placed by other carriers. The committee finds that at the present time (December 1) the number of cars of freight on the tracks of the trunk lines at and destined for New York City terminals is about forty thousand; and that probably ninety per cent of these cars contain freight which is to be exported or which must be lightered for local delivery in the harbor.

The Pennsylvania Railroad gives details of the congestion on the lines of that company as follows:

"There were on November 30 on hand on the various divisions east of Pittsburgh and Erie 6,151 cars of freight for export and lighterage at New York. The location of these cars is as follows:

Greenville	1,335
Harsimus Cove	523
Meadows	91
Waverly	1
West Morrisville	21
Trenton Division	15
Moving New York Division	89
Stored West Morrisville	92
Stored Bristol	44
Stored between Rahway and Elizabeth	410
At Morrisville to be drilled	88
Stored Waldo avenue	37
Total in New Jersey	2,746
Other divisions	
Eastern Pennsylvania Division	1,766
Moving Eastern Pennsylvania Division	176
Western Pennsylvania Division	623
Philadelphia Terminal Division	34
Maryland Division	163
Central Division	328
New York, Philadelphia & Norfolk Railroad	124
Delaware Division	191
Total	3,405
Total east of Pittsburgh and Erie	6,151

"In addition to the lighterage freight being held in cars, there have been unloaded on piers in New York some 2,000 carloads, which is now awaiting orders. A special bureau, in charge of operating, traffic and accounting officers, has been established in New York to handle this extraordinary situation. This bureau keeps careful records of exactly where these cars are located, so that when ordered by a shipper for delivery they can be picked out and forwarded with the least possible delay.

"Another special bureau has been established to take charge of the local freight situation on the New York division. There are on various divisions of the railroad at the present time, exclusive of cars of freight for lighterage, some 7,000 cars of slow freight for delivery or movement through the New York terminal district. This includes some 2,000 cars for New England points. Records corrected every twelve hours show the exact location of each of these cars.

"These methods have proved effective in keeping the railroad open, and there is no congestion in the movement of westbound freight.

"There are at present stored at different points on the road 450 cars of flour and 125 cars of lumber under through bills of lading for export through New York. In addition to the 1,000,000 bushels of grain in the Girard Point elevator at Philadelphia, there are 1,778 cars—2,600,000 bushels—of export grain on hand to go through that elevator, many of them being held at points west of Philadelphia until they can be taken care of.

"In addition to the 2,000,000 bushels of grain in the Baltimore elevator there are 2,829 cars of export grain on hand destined to go through that elevator. Seventeen boats are in Baltimore Harbor to-day to load grain; 5 of these have already received their cargoes. It is very indefinite what boats are expected at Baltimore the next week. However, space at Baltimore has been contracted for up to December 15 that will require 32 boats. The average capacity of a boat is 250,000 bushels."

WHY TEXAS RAILROADS ARE IN RECEIVERS' HANDS

Henry N. Pope, president of the Farmers' Union of Texas, recently made a statement through Texas newspapers, calling on the men who manage railroad properties to "speak out" as to the responsibility for railroad receiverships in the Southwest. Following are replies to Mr. Pope's statement made by C. E. Schaff, receiver of the Missouri, Kansas & Texas, and by W. B. Scott, president of the Sunset-Central Lines. Mr. Schaff said in part:

"Commenting on the fact that railways comprising 30 per cent of the mileage in the state of Texas, and 45 per cent of the railroad investment in the state, are now in the hands of receivers, Mr. Pope has suggested that the people would like to have the 'plain truth from the men who manage the properties' as to the underlying causes of these receiverships. So far as the Missouri, Kansas & Texas is concerned, the 'plain truth' is, as usual, quite simple. The road's revenues, limited by federal and state agencies, have not kept pace with the increases in its expenses—increases that the management has been entirely unable to escape, and for which in most instances the management is not responsible. As a result its credit has been impaired and it has been unable to refund maturing obligations.

"Direct reply to any one of the specific inquiries Mr. Pope makes would not cover the situation. There are peculiar conditions, bearing on the financial situation of each carrier. In no case, however, would these peculiar conditions have resulted in bankruptcy except for general conditions affecting all. It is to these general conditions that thought must be directed before the present unsatisfactory condition can be corrected.

"To contend that the 'roads were unwisely built,' in the face of unanimous agreement that the Southwest needs improved, rather than impaired transportation, is useless. To say that the receiverships are due to 'manipulation by railroad financiers,' or to 'unnecessary expenses forced by law,' or to 'lack of revenue and improper expenditure,' or to 'mismanagement of the properties' would be inaccurate, even though any one of these elements may have contributed to bring bankruptcy in a special case. It is idle to disregard specific instances of 'manipulation by railroad financiers' as factors in developing adverse public sentiment which has encouraged legislatures and public service commissions to pursue unreasonable regulatory policies. It is equally idle to ignore the obvious fact that legislatures and public service commissions have utterly disregarded repeated warnings by railway managers that continuing decreases in net operating returns, due to increased operating expenses without proportionate increase in operating revenues, must result in disaster.

"Whatever may be said of 'financial management' will not change the fact developed in figures compiled by the Interstate Commerce Commission that between the years 1907 and 1914 the increase in cost of road and equipment of 41 western railways was $1,250,000,000, while between the same years there was an actual decrease in their net operating income of $23,500,000. In short, these railroads after increasing the actual investment in their properties, had less money with which to pay a return on investment than they had before. These figures are not affected by financial management, good or bad. Increases in gross earnings have been more than swallowed up by increasing wages to employees, increasing taxes, and increasing expenditures enforced by impractical regulatory policies that have not benefited the public. In the past eight years railroad taxes have practically doubled. In the same period the gross operating income of American railways has increased only 24 per cent, while their gross operating expenses have increased 40 per cent.

"Federal and state agencies have operated to hold earnings down so that the carrier has had so small a margin in periods of normal business activity that his margin entirely disappeared during the depressed periods. In the case of the Missouri, Kan-

sas & Texas, during the years from 1907 to 1914, operating revenues per mile declined from $8,523 to $8,241 or 3.3 per cent. Operating expenses increased from $5,735 per mile to $6,469, or 12 per cent, and operating income decreased from $2,770 per mile to $1,772, or 36 per cent. In these figures are to be found the outstanding reasons for the receivership.

"The road simply has not ben permitted to make earnings that would provide a return on invested capital. The same condition applies to all carriers, and it clearly explains the impairment of railroad credit. So long as the regulating authorities do not permit railway earnings that will provide proper return on invested capital, regardless of the value of the service rendered the public, the public must expect carriers to become bankrupt, just as do individuals who do not operate on proper business margins.

"Responsibility may rest on some railway managements for conditions against which the public may have complained properly. No railroad man should find fault with government effort to prevent dishonest or unfair transportation practices. Such effort constructively directed will help rather than hinder the carriers. But such efforts alone will not help carriers to provide a return on invested capital, which they must do if the present unsatisfactory condition is to be remedied. And so long as the public does not discharge its duty to see to it that the regulating authorities give the railroads fair treatment, the public should expect to assume a large share of responsibility for railway bankruptcy."

Mr. Scott said in part:

"In my judgment, the Texas roads now in the hands of their creditors are there because of the simple fact that they cannot, with the existing freight rates, meet their current expenses and give the people what the people, the legislatures and the commissions demand. The candle must not be consumed at both ends.

"Business to be successful must earn net returns while its permanency is carefully maintained. Railroads are nowise diffent from commercial establishments in this respect, as witness the extent of the present receiverships in Texas and the number of roads included therein. Revenues must equal expense of operation, interest on obligations, taxes and renewals, to say nothing of rails and additional conveniences. When earnings fall off retrenchment necessarily follows, and this means fewer employees, reduction and impairment of service, and economies that sometimes seriously affect the maintenance that makes for safety and comfort, but which cannot be avoided.

"The old-time bugaboos—watered stock, over-capitalization, top-heavy bonds and incompetent administration—have no place in the operation of a trunk-line road. Mismanagement is quickly followed by a change of administration, while the roads which were established years since could not be built to-day for almost double the stock and bonds which represent their obligations.

"The roads which have contributed to the development of Texas were not unwisely built, even though they were projected at a time when money was scarce and when the state was barren of immediate results, the builders having only their own faith in the prospective upbuilding of the state, based upon a knowledge of the productivity of the soil and the opportunities which awaited the man of ambition and energy.

"For the last 10 years the Texas railroads have been beset upon every side. Legislation has decreased their earning powers while increasing their expenses and liabilities. Increase in labor charges and prices of material represent additional factors that have gradually lessened the earnings, while constant manipulation of rates, rate situations and changes in jobbing and competitive centers have reduced compensation for service all along the line.

"A casual examination of the following statistics, which relate to the Sunset-Central lines only, will, I am sure, convey a few of our arguments more forcefully than any I think I could present:

"Expenditures on account of state, federal and municipal requirements and safety devices, $2,200,000; the storm damage during the last two years amounted to $900,000; personal injury payments, Texas, $165 per mile in 1906; personal injury payments, Texas, $275 per mile in 1914; personal injury payments, entire United States in 1913 constituted .985 per cent of earnings, while in Texas during the same year this expense was 2.472 per cent of the earnings; mail earnings per passenger train mile, 10.4c in 1906; mail earnings per passenger train mile, 7.2c in 1914; increased price fuel oil, 1915 over 1906, 109 per cent; increase in all classes of labor from 20 per cent to 90 per cent, 1915, compared with 1900.

"Freight rates instead of being readjusted to conform to changed conditions have been gradually lowered in most of the tariffs until the minima are from 20 per cent to 70 per cent and the maxima from 10 per cent to 50 per cent lower than the railroad commission considered reasonable more than 20 years ago, while many important items of expense have doubled.

"The whole situation resolves itself into a plain business proposition. The people rightfully demand safe and reliable transportation. This means good roadbed, new ties, heavy rail, first-class motive power, good passenger cars with modern conveniences, sound bridges, comfortable depots for passengers, convenient and adequate facilities for freight. All of these cost money, more money than the average Texas road can provide under the present conditions.

"Increase in labor and material changes, taxes, personal injury verdicts, flood and storm damages, should be met by additional earnings, and as earnings are reflected in rates of transportation it follows the rates should be revised upward instead of downward, and the roads given an opportunity of meeting their obligations to the public upon a broad and fair basis. Prosecution and persecution, baiting and browbeating, should be shelved, and instead there should be put into effect a spirit of mutual understanding and help and recognition of the great community of interest which makes the railroads and the public and particularly the farming public, positively dependent each upon the other."

RAILWAY HOTEL IN RHODESIA.—A $250,000 palatial hotel, now building at Victoria Falls, in Africa, is to be opened next year. It has been leased to the Rhodesia Railways (Ltd.).

SUBSIDIZED CARRIERS.—Local branches of the New York Central have severely felt, during the past summer, the competition of automobiles run over state highways. The 'bus lines make trips at convenient hours for many people, but they run over a state-built road bed, doing a public-utility business without Public Service regulation, charging what they please and operating when they please. Their service may be discontinued during the winter months, when passenger trains are generally operated in this section at a loss. A railroad is responsible for accidents to passengers or goods. No guarantee holds good with auto buses or freight stages, unless the owner happens to carry heavy liability insurance. In fact, the advantages given the average 'bus operator practically make him a state-subsidized competitor of the railroad.—*Watertown (N. Y.) Herald.*

A COLOSSAL COAL TRAIN.—The English sometimes smile at the American's love for striking statistics. That has not prevented one Englishman, nevertheless, from compiling the following: On the Midland Railway the quantity of coal and coke consumed during one year is over 1,830,013 tons. If this were represented by a single block of Derbyshire coal, the block would be over 1,000 ft. long and wide and over 60 ft. in height. All the people in Derbyshire could stand in comfort on this block, which would outweigh the entire population of England and Wales. If the year's coal and coke were placed in railway cars, each carrying 10 tons, the resultant train with its engines (3,014 of them) would be long enough to reach from St. Pancras to the extreme north of Scotland. The cost to the Midland Company of this fuel is $9.30 per minute—over $13,220 per day, and more than $5,000,000 a year.

Four-Wheel Trucks for Passenger Train Equipment*

A Discussion of the Fundamental Factors of Design and of the Ability of This Type of Truck to Fulfill Them

By Roy V. Wright

The Pennsylvania Railroad uses four-wheel trucks under all of its passenger coaches, although the P 70 class, 70 ft. in length and having a seating capacity of 88, weigh light from 118,000 to 122,000 lb. Loaded with passengers they weigh about 135,000 lb., and never more than 140,000 lb. It is the standard practice on that system to use such trucks under all passenger equipment cars weighing less than 120,000 to 125,000 lb., except for so-called load-carrying cars, including baggage-express, mail, baggage-mail, etc., which are designed to weigh over 140,000 lb. when loaded. The light weight of the bodies of the Pennsylvania P 70 coaches—and these are now standard on that system—varies from 93,000 to 96,000 lb. It is assumed that these cars regularly carry as much weight in passengers and hand baggage as coaches on other roads, inasmuch as they seat 88 persons, or several more than the maximum provided for in the standard coaches of most roads. It is the practice on the great majority of railroads to use six-wheel trucks under coach bodies weighing much less than this, comparatively few roads using four-wheel trucks under bodies weighing more than 85,000 lb. and many of them using six-wheel trucks under bodies weighing even less than this.

FACTORS IN DESIGN

In designing the trucks for a passenger coach four features must be kept in mind and generally in the following order as to importance, although there may be some question as to the relative value of the last two:

(1) They must be designed for safety.

(2) They must ride smoothly, for travelers are particular as to this in these days and will desert a road with rough-riding cars if a competitor furnishes better service. With heavy steel cars operated in long trains at high speed and with the locomotives taxed to the limit of their capacity it is difficult to operate and brake the trains without occasional roughness and jolts, and a factor such as truck design cannot be allowed to contribute further to the rough riding.

(3) The weight of the truck must be kept to a minimum if for no other reason than the effect on the cost of conducting transportation.

(4) The truck should be designed with a view to keeping the cost of maintenance as low as possible. Here, as in the requirement for safety, it is desirable to have as few parts as possible and of simple construction.

DOES THE FOUR-WHEEL TRUCK MEET THESE REQUIREMENTS?

How does the four-wheel truck meet these requirements under the heavy passenger equipment in service on the Pennsylvania Railroad?

(1) The four-wheel truck of modern steel construction which has been in use on that system for a number of years has given splendid satisfaction so far as safety is concerned. As on other roads some trouble has been experienced with hot boxes, and it was at first thought that the journal-bearing area was too small. The use of larger bearing areas does not seem to have materially improved conditions, and it is now believed that the difficulty is entirely due to dirt or gritty matter entering the journal boxes. The problem then becomes one of improving the journal box lid and dust guard to prevent this, rather than to increase the diameter or length of the journals.

There has been no breakage of axles except for three cases due to defective material when the first steel trucks were introduced many years ago. No physical weakness has developed in any of the parts in the ten years the trucks have been in service, so that as far as safety is concerned there can be no question. The possibility of accident would seem to be less with the four-wheel truck because of the smaller number of parts that are required.

(2) There seems to be a feeling on the part of some mechanical engineers that the four-wheel truck, with its shorter wheel base (7 or 8 ft. as compared with 10 to 11 ft. for the six-wheel truck) will ride less easily than the six-wheel truck. With coil springs over the journals, elliptical springs under the bolster, and provision for lateral motion of the bolster, it would seem that there ought not to be much difference in this respect.

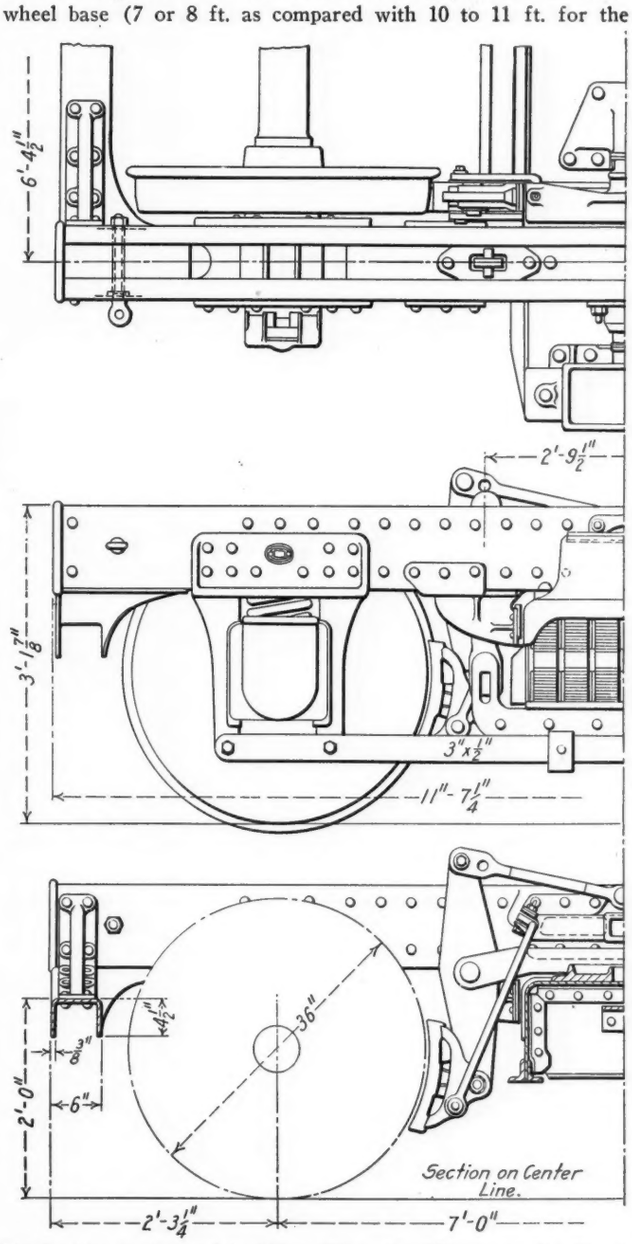


Fig. 1—One End of Original Four-Wheel Steel Passenger Car Truck Before the Application of the Clasp Brakes; Pennsylvania Railroad

Experiments show that much of the rough riding or jolting on passenger coaches has been due to the method of anchor-

* From a paper to be presented at the December, 1915, meeting of the American Society of Mechanical Engineers, New York.

ing the top of the dead lever to the truck frame. The unbalanced forces in the truck when the brakes are applied tend to tilt the truck frame out of horizontal alinement, thus causing a "jerky" action. By anchoring the dead lever to the body underframe this is eliminated. This development is comparatively recent and affects the six-wheel as well as the four-wheel truck. The effect of anchoring the dead lever to the truck frame has possibly been more noticeable on the four-wheel truck, because

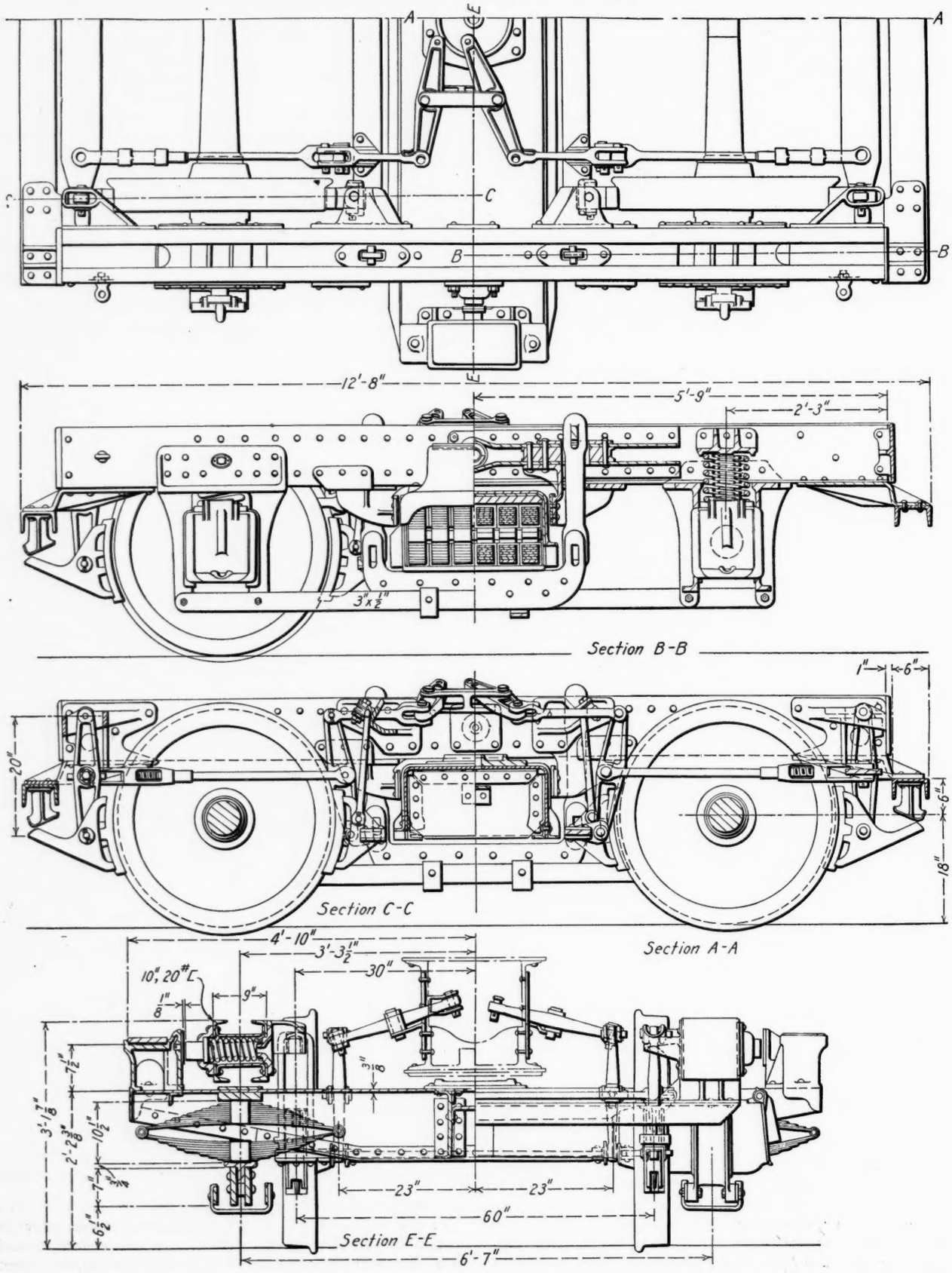


Fig. 2—Original Four-Wheel Steel Passenger Car Truck with Clasp Brakes Applied; Pennsylvania Railroad

one-to-one dead levers are used, resulting in a greater pull on the frame than in the case of the six-wheel truck; then, too, the resisting moment is less because of the shorter wheel base of the four-wheel truck. This improvement has been patented.

(3) There is a wide variation in the weights of different types of steel passenger car trucks, but it is probably fair to state that a pair of four-wheel trucks will weigh from 10,000 to 15,000 lb., or more, less than a pair of six-wheel trucks having the same carrying capacity. In other words, for the same total weight of car the one with four-wheel trucks will carry ten to fifteen thousand pounds more loading or body weight, or with the same weight of body the total weight of the car with four-wheel trucks will be from 10,000 to 15,000 lb. less than the one with six-wheel trucks. For a car weighing 120,000 lb. and equipped with four-wheel trucks this means a saving of from 8 to 11 per cent in total weight as compared with what it would be if six-wheel trucks were used. On most roads it is the practice to carry car bodies weighing more than 85,000 lb. on six-

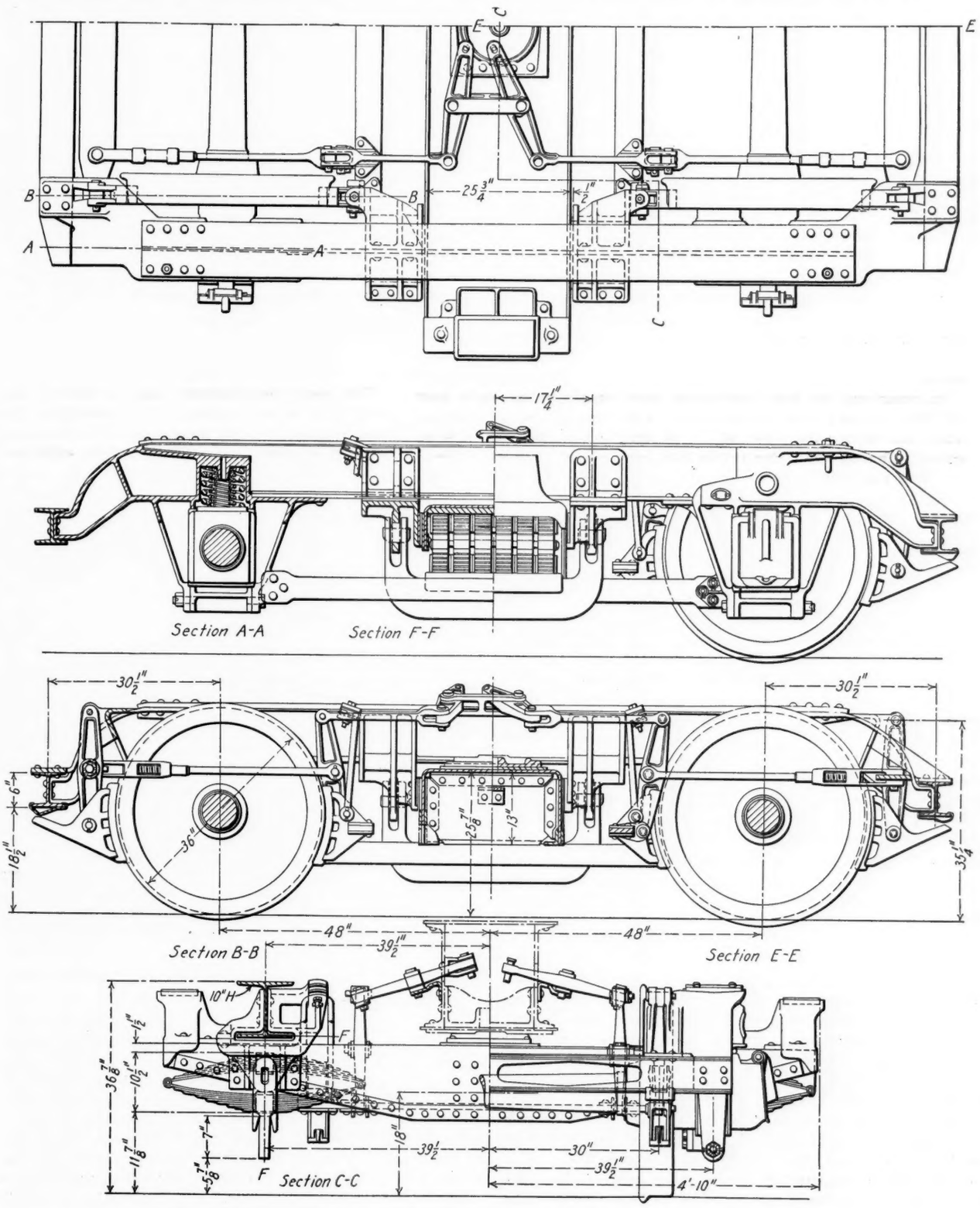


Fig. 3—Present Standard Four-Wheel Steel Passenger Car Truck; Pennsylvania Railroad

wheel trucks, which weigh fully 15,000 lb. per car more than four-wheel trucks. A locomotive that can haul eight cars equipped with such six-wheel trucks over a given division will haul nine cars of the same seating capacity having four-wheel trucks—a saving much to be desired.

(4) Roughly speaking, the cost of maintenance of a steel passenger car truck may be said to be very nearly in proportion to the number of its wheels and axles, these with the brake shoes being the parts subjected to the greatest wear and requiring frequent repairs and renewals. While no exhaustive data is available as to the comparative cost of repairs and maintenance of six-wheel and four-wheel trucks of the same carrying capacity, they are said by those who have checked these costs to be at least 50 per cent greater for the six-wheel truck than for the four-wheel truck.

DEVELOPMENT OF PENNSYLVANIA FOUR-WHEEL TRUCK

As a partial check on these conclusions, it is proposed to briefly review the development of the four-wheel steel truck for passenger cars on the Pennsylvania Railroad. From the outset and throughout this development the aim has been to reduce the number of parts to a minimum and make the construction as simple as possible. The problem has been complicated somewhat by the necessity of providing for the application of motors to the trucks used under motor cars in electrified districts and also by the application within the past few years of the clasp brakes, which are now standard on the Pennsylvania for all four-wheel trucks and for all new passenger equipment trucks.

In designing the first four-wheel steel trucks in the early part of 1905 it was aimed to use them under the largest coach possible and keep within the M. C. B. load limits for 5-in. x 9-in. axles. Shortly after the trucks had been placed in service three of the axles broke in the wheel seat, where the stress is least. Investigation finally showed that the breakage was due to defects in manufacturing caused by a faulty furnace which had been discarded shortly after these axles were made. In the meantime, however, as a measure of absolute safety, it was decided to increase the axles on existing cars ½ in. in diameter and on new cars go to the next larger size standard M. C. B. axle, the 5½-in. x 10-in. Because of hot box troubles the length of journal was afterward increased to 11 in., although experience has since indicated, as previously noted, that the trouble was probably due more to dirt getting into the journal box than the lack of journal bearing area. The 5½-in. x 11-in. journal is now standard for all four-wheel as well as six-wheel trucks.

In going from the wood to the steel construction spring planks, axle guards and brake beams were done away with, the brake levers being attached directly to the brake heads. Each side frame was formed of two 10-in. 20-lb. channels, with the flanges turned inward and forming a box girder construction. The channels were spaced so as to measure 9 in. over-all. This was done to provide sufficient strength for resisting the lateral stresses, a requirement which has been overlooked in some designs. To check or limit the lateral motion or swaying of the bolster a spring arrangement was used, as shown in the drawing.

The subsequent use of clasp brakes made it necessary to modify this design somewhat. Fig. 2 shows the details of this modified design, which in general is practically the same as the original design, other than the braking arrangement, except for changes in the end construction of the frame to provide for the outside brakes. The detail of the original end construction is shown in Fig. 1. The end rail in the original design, which was formed of a ⅜-in. plate pressed in the form of an inverted U, 6 in. in width, was changed to make room for the brake levers. The outside brakeheads in the case of the clasp brakes are attached to the lower ends of the brake levers, which are anchored at the top to castings riveted to the ends of the side frames. A 6-in. channel with flanges turned downward connects these castings and forms the end rail. It was also necessary to add brakehead tie bars because of the impossibility of connecting the tension rods for the outer brakeheads direct to the brake lever. It should be noted, however, that this brakehead tie bar is a simple rectangular bar and that the brake tension rod connects to it as close to the brakehead as possible. Obviously the weight and the cost of maintenance of this tie bar is much less than for a brakebeam where the force is applied at the middle. All of the brake levers, including both the dead and live levers, are made the same size and are interchangeable except for the drilling.

The peculiar form of the outer brakehead is noticeable. In the first application of the clasp brakes the ordinary type of brakehead was used, with springs to hold it balanced when hanging loose. These springs were difficult to maintain and were done away with by redesigning the brakehead and adding the tail piece. When the brakehead hangs loose this tail piece rests against a casting which is riveted to the underside of the end rail. When the brake is applied there is a clearance of ½ in. between the brakehead tail piece and the rest. This device has given most satisfactory results.

The next development was a modification of this design to provide for the application of a motor for use under motor cars on electrified divisions. To do this it was found necessary to increase the wheel base from 7 ft. to 8 ft. 6 in. Transoms were also added to support the lip of the motor and the bolster design was modified slightly; otherwise the same parts were used as in the original design.

The next development was a radical one, the box girder sideframe being replaced by a Bethlehem 10-in. 54-lb. H-beam, thus simplifying the design as to construction by reducing the number of parts and still providing sufficient moment to resist the side stresses. As shown in Fig. 3, the journal box pedestal casting has a projection to which the top of the lever for the outside brake is anchored and which also supports the end rail, a 6-in H-beam. The H-beam which forms the side frame has its lower flange and web cut away over part of the journal box pedestal casting and is strongly riveted to it through both the upper and lower flanges. The casting which was formerly used on the end rail to balance the brakehead was replaced by a steel clip which is sprung over and welded to the lower flanges of the end rail.

Another noticeable change was the shortening of the bolster hangers, thus limiting the amount of side swing and making it possible to do away with the complicated spring mechanism which was formerly used to check and limit the lateral motion of the bolster with the longer hangers. Before making this change the springs were gradually blocked and finally wedged solid on a number of the cars. As this had no noticeable effect on the smooth riding, it was decided to discard the springs entirely.

The more important of these changes, that is, the side frame construction and the change in the hanging of the bolster, were first made on four-wheel trucks for suburban cars, several hundred of which were built. These trucks, however, were of lighter construction than those used under the standard coaches and will not be considered in this discussion. The details of this improved truck as designed for use under standard coaches are shown in Fig. 3.

THE BAGDAD RAILWAY.—The Sofia correspondent of a Holland paper writing on the progress of the Bagdad Railway, points out that there is now only wanting the completion of the Bagdad tunnel, which was pierced in May, and upon which work is now being prosecuted with all available energy, and the 24 miles of railway through the Taurus mountains—the most difficult piece of the whole line, in which about 70 tunnels, viaducts, and other engineering works occur. It is hoped that the work will be completed in the course of next year. The continuation of the line from Bagdad has proceeded north to Tekrif 90 miles.

A Large Track Depression Project at Minneapolis

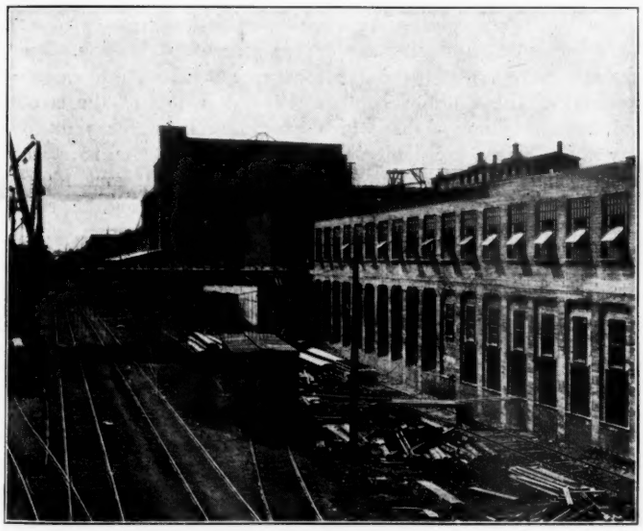
The Chicago, Milwaukee & St. Paul is Building Concrete Street Viaducts to Eliminate 37 Grade Crossings

By C. N. Bainbridge
Office Engineer, Chicago, Milwaukee & St. Paul, Chicago

One of the largest projects for the elimination of grade crossings recently undertaken is the depression of the tracks of the Hastings and Dakota division of the Chicago, Milwaukee & St. Paul through the southwest part of Minneapolis. With but few exceptions, the elimination of grade crossings in cities has been brought about by the elevation of the tracks and the depression of the streets. In the work described herein, these methods are reversed, i. e., the tracks are being depressed from 18 to 20 ft., and the streets are being elevated from 2 to 4 ft. and carried across the depression on bridges. Thirty-seven grade crossings are to be eliminated and the depression extends for approximately three miles.

Just prior to the completion of the Puget Sound extension from Mobridge to Seattle in 1909, the double tracking of the line from Minneapolis through Aberdeen to Mobridge was commenced and the grading has now been practically completed from Minneapolis to Aberdeen, with the exception of a short stretch at the eastern terminus, which is being constructed as fast as the track depression progresses.

In the latter part of December, 1910, the St. Paul was ordered by city ordinance to depress its tracks westward through the city from Hiawatha avenue to Irving avenue, and to carry over its tracks on bridges, all streets within these limits which crossed the right of way at grade. Previous to the passage of this ordinance, Fourth and Fifth avenues, which are located about midway of the depression, formed natural undercrossings with the tracks due to the topography of the site. The ordinance



A Building Being Underpinned by Concrete Columns

requires that the street which originally passed under the tracks at Fourth avenue shall be carried over the tracks on a viaduct. Fifth avenue, however, is a less important street, and the ordinance allows this to become a grade crossing, thereby avoiding considerable property damages. Hennepin avenue, situated at the west end of the depression, had previously (in 1897) been carried across the tracks and no further change was required.

Work was started at the west end early in 1912, and has been carried on continuously, with the exception of two or three months during the winter seasons. The project is now approximately 75 per cent completed, and it is the intention to complete the work in the fall of 1916.

The tracks which are to be depressed pass through a portion of the better residence district of Minneapolis and although numerous industries line the right of way for the greater part of the distance, it was desirable to have the finished work give as pleasing an effect as possible. Considerable attention was, therefore, given to the selection of the most suitable type of bridge. The tracks cross practically all of the streets at an angle of approximately 90 deg. and the right of way was of sufficient width throughout, with one or two exceptions, where additional land had to be bought, to adopt a uniform span bridge. Although there was some variation in the width of streets and roadways as required by the city, it was thought that probably unit construction (building slab and bent units at a central plant and lifting them into place) could be adopted. Accordingly designs were made and estimates and methods of erection were studied, but after due consideration, it was decided

A Shovel Taking a Third Cut

to abandon the idea of unit construction and build the structures in place, for the following reasons:

(1) About 50 per cent of the concrete in each bridge would have to be built in place in both bridges, of unit construction and those of monolithic construction. This would have required a movable plant for the abutments, as well as a stationary plant for the slabs and bents, if the structures had been built as units.

(2) Estimates showed that a larger yardage of concrete would be required in the unit than in the monolithic construction, as well as more steel, due to erection stresses and simple instead of continuous beam action.

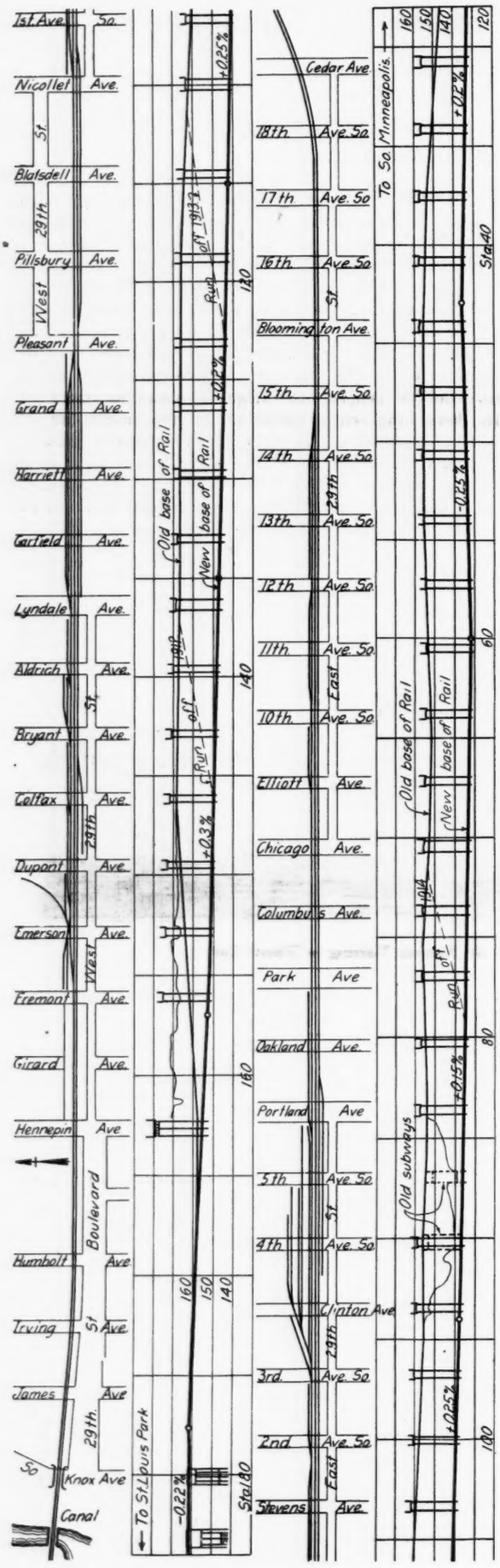
(3) The work would extend over three or four seasons, and in order to run the stationary plant efficiently, all the work on the different units would have to be done continuously, covering a period of about nine months. This would have necessitated space for the storage of some of the slabs and bents for from one to two years, besides tying up a considerable amount of money for a long time before the structures would really be required.

(4) The mixing and placing of concrete would have been cheaper in the unit construction than it is in the monolithic construction, provided the stationary plant were run efficiently and a large number of the units were alike, so that the forms could have been used to advantage. It was estimated, however, that this difference in cost would be practically balanced by the additional yardage and additional cost of storing and erecting units after they were made.

(5) In the case of unit construction, it would have been necessary to know beforehand just how each crossing was to be treated, and no changes could have been made later without discarding units already made. The monolithic construction had the advantage over the unit construction in that it allows a modification of the bridges to meet local conditions up to the time each bridge is built.

(6) Owing to the excessive weight of the units, it would have been necessary to alter the heaviest erecting equipment of the railway in order that it might lift and swing these slabs into position. This would have prevented the use of the equipment for other work for two or three years.

(7) In the case of unit construction, there would have been occasion to interfere with traffic to a greater extent than with the monolithic



Layout and Profile of the Track Depression

construction. This would be caused by the hauling of the different units from the storage yard or plant to the bridge; shifting the position of the derrick car from one track to another, to facilitate the placing of the units; and, finally, the placing of the units themselves, which would weigh from 35 to 45 tons. These would have to be lifted and swung a considerable distance, making the chance of accident greater with the unit system than with the monolithic system.

BRIDGES

The type of structure finally adopted is that shown in the accompanying drawing. The bridges are of reinforced concrete and conform to a uniform design. On account of the various widths of roadways, the structures vary in width from 48 ft. to 68 ft. overall, including the roadway, two 8-ft. sidewalks and hand railings; and with the exception of two structures, they consist of three spans, the center one being 29 ft. 6 in., and the side spans 29 ft. in the clear. They are supported at the ends on abutments, and at the third points on skeleton piers or columns. This arrangement permits placing two main tracks under the center span. The side spans cover the slope of the cut where only two main tracks are depressed, but they are of sufficient width to allow the placing of two additional tracks on either side for industrial purposes or railway use, as conditions require, with the alteration of abutments only.

The two exceptions noted above, one at Fourth avenue and the other at Clinton avenue, are of 10 spans and 6 spans respectively, and carry those streets across a team yard which will be located about midway of the depression. Entrance to the team yard is to be made from Twenty-ninth street, which parallels the tracks, and also from Fifth avenue, which, as previously mentioned, is to become a grade crossing. The clearance over the main tracks is 18 ft. 6 in., and that over the side tracks or industry tracks is 18 ft.

The abutments used under these bridges are of three types:

(1) The small bank abutment used on bridges which do not make provisions for industry tracks under the side span.
(2) The intermediate height abutment, which is high enough to provide for one track under the side span.
(3) The high abutment, which is high enough to provide for two tracks under the side span.

The small bank abutments are of the ordinary gravity type. They are but 9 ft. high from bridge seat to foundation. The footing is 2 ft. thick, and the toe projects 12 in. beyond the neatwork. The abutments extend the full width of the street and have retaining walls, which extend back to the right of way line. They are built in two sections for the narrower streets, and in three sections for streets of 80- and 100-ft. widths. The intermediate height abutments are of the reinforced concrete counterfort type, and are 19 ft. high from bridge seat to foundation. The toe projects 3 ft. 6 in. beyond the face of abutment and the footing is stepped in the rear. Counterforts are provided every 12 ft. The high abutments are of the reinforced concrete counterfort type, and are 24 ft. 6 in. high from bridge seat to footing. The toe extends 4 ft. 6 in. in front of the abutment and is 3 ft. 6 in. deep. The base is stepped twice in the rear, the total width of base being 15 ft. 6 in. The bridge seat on all abutments is 18 in. wide, not including a 4-in. coping; 1:3:6 concrete was used in the gravity abutments, and 1:2½:5 concrete in the reinforced type.

The piers of the bridges are 25 ft. 6 in. high and consist of four, five or six columns, depending on the width of the bridges, and rest on spread footings of plain concrete. The columns are 2 ft. square, spaced about 11 ft. 6 in. center to center. The footings were poured in one run, reinforcing bars projecting about 4 ft. above the construction joint to form a splice with the main reinforcing steel in the columns. A key block 14 in. square is placed at the construction joint at the base of each column. The cross girders connecting the top of the columns are cast with the floor beams. These girders are 2 ft. thick and 4 ft. 6 in. deep and are joined to the columns by circular arches, which add materially to the strength and appearance of the structure. They are reinforced as a continuous beam with straight bars in the top and bottom and with stirrups and bent-up bars. The fillets or curved portion are reinforced with

bars placed at 45 deg. The footings are of 1:3:6 plain concrete and the remainder of the bent is 1:2:4 concrete.

The accompanying illustration shows also the saddle which is used to protect the sewers crossing the right of way. This consists of an 8-in. layer of concrete forming an arch, reinforced with ¾-in. bars along the intrados and ½-in. bars along the extrados. A 1-in. layer of felt is placed between the concrete covering and the top of the sewer.

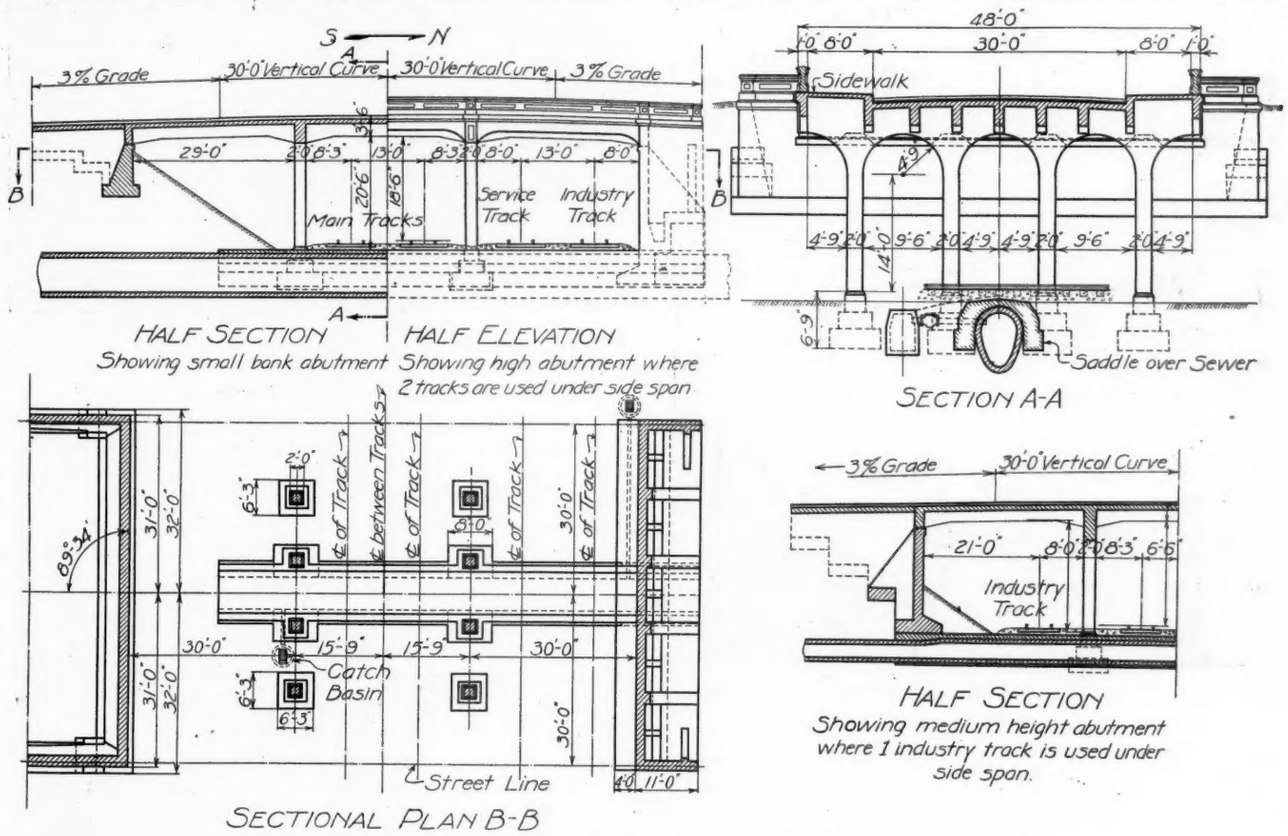
The floors of the bridges are of the T-beam type, are 3 ft. 6 in. deep, including 5 in. of paving, and are built continuous from abutment to abutment, a distance of 91 ft. 6 in., expansion joints being placed at the bridge seats. The stems of the beams under the roadway are 13 in. wide, spaced 5 ft. center to center. The sidewalk slab has a span of 8 ft. The outer beam under the sidewalk was given the form of three 3-centered arches for appearance. All other beams are straight on the bottom with fillets at the supports. The beams are figured as continuous for three spans and are reinforced with 1-in. and ¾-in. bars, part of which are bent up near the supports to provide for shear and negative moment over the supports. Vertical stirrups are also used in reinforcing for sheer. As a precaution against cracks, due to any unequal settlement which might occur at the abutments or piers, a small excess of steel is placed over the center supports and in the beams. The foundations are for the most part of good gravel, and, as the structures are designed for a bearing of only 2.5 tons per sq. ft. on the foundations, the danger of unequal settlement is slight.

The slabs between the T-beams vary in thickness from 6½ in. to 11 in., to provide for the crown of roadway and the grade on the bridge. They are reinforced with straight and bent ½-in. bars spaced 6 in. center to center. The sidewalk slabs are 5½-in. reinforced concrete and is built in place, after the floor is completed.

Water and gas mains as well as numerous conduits of various utility companies were encountered at the majority of the streets. Ledges are provided on the side of the stems of adjacent

The Concrete Plant—A Temporary Foot Bridge in the Background

T-beams to carry the conduits across the bridges. At first the gas and water mains were carried across the depression beneath the abutments and tracks. The cost of this, however, proved to be excessive and provisions are now made to carry the water pipes across under the bridge floors in a similar man-



Typical Plan of Reinforced Concrete Viaducts

thick, have a 1-in. finishing coat on top, and are reinforced with ½-in. bent bars spaced 7 in. center to center. Concrete in the slabs, beams and cross girders is of 1:2:4 mix. A layer of 1:2 cement mortar is placed in the bottom of all beams and slabs to a sufficient depth to insure the covering of all bars before any concrete is poured. The hand rail is of the solid type

ner to that used for the conduits. A compressed fiber covering of about 3 in. in thickness is placed around the pipes, the fiber being moulded to fit the pipe. Wrought pipe with screw threads is used across the bridges in place of the usual cast iron pipe.

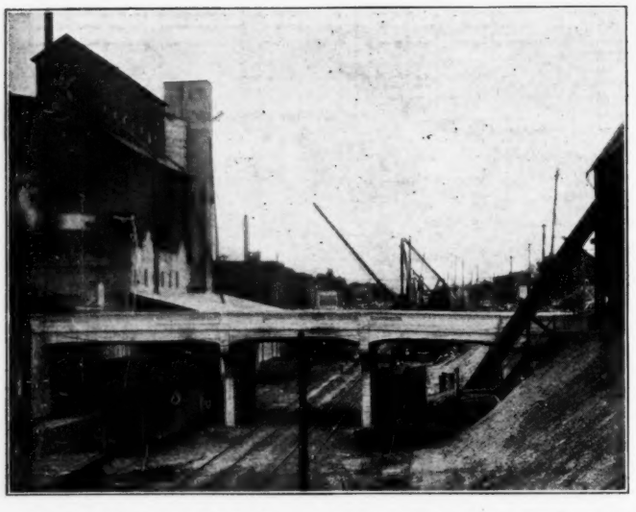
The bridges which do not carry street cars are designed to carry a moving concentrated load of 24 tons on two axles at

5-ft. gage and a load of 100 lb. per sq. ft. upon the remaining portion of the roadway. The six bridges which carry street cars are designed to carry two 40-ton cars and 100 lb. per sq. ft. upon the remaining portion of the roadway. The live loads are increased 50 per cent to provide for impact.

INDUSTRIES AND INDUSTRY TRACK FACILITIES

The majority of the industries are located on the north side of the tracks, Twenty-ninth street being adjacent to the right of way on the south side for nearly the full length of the depression. The presence of these industries introduced special problems and was the cause of considerable delay and numerous controversies.

The industrial concerns maintained that the railway company was liable for the cost of all changes to industries and industry tracks made necessary to continue service on the lower level after the main tracks had been depressed. The railway company, on the other hand, contended that the tracks were lowered by order of the city authorities as a measure of public safety, and not for the benefits, nor on the initiative of the railroad, and that therefore the industries should make any adjustments required at their own expense and also pay the cost of changing the tracks serving them. Litigation was avoided when the railway company decided, because of the many switches and the great amount of switching which would otherwise come off of the main track, to construct a third track from which to serve the industry spurs. As in practically all cases the right of way was only wide enough to depress two main tracks without resorting to retaining walls, the railway company contributed to the industries an amount approximately equivalent to what it would have had to expend to construct a retaining wall, within the right of way, adequate to provide for the third track, if the spur tracks were absent. The industries expended this money in altering their plants and providing the spur tracks, while the railroad was relieved from any further responsibility for retaining adjacent lands. Notwithstanding this decision of the railroad company, the result to the industries in providing



Elevation of a Typical Viaduct—Elevator for Raising Coal on the Right

themselves with industry tracks and adjusting their plants to the lower level, was a very large and burdensome expense, and it was also a large additionad burden to the railroad.

There are about 20 industries situated along the depression and no two were treated alike. Each industry required special treatment to meet the requirements of the particular situation. For the most part, each industry handled its work with its own engineers, although the railroad assisted to a considerable extent with suggestions. In some cases where the buildings were old and of little value, they were torn down and the entire property excavated to the new track level and new buildings constructed. Other concerns underpinned the buildings, and added shipping and receiving floors beneath, while still others allowed the slopes to extend under the building, supporting the buildings on skeleton framework. The accompanying photographs illustrate some of the methods used in solving the various problems.

CONSTRUCTION

The excavation work is being done with a 65-ton Bucyrus shovel, the material being removed by two trains of 20 standard gage 12-yd. air dump cars each. The excavated material varies from sand to gravel and is used largely for filling a site for a freight yard at Bass Lake, about nine miles from the depression, and also for taking out some sags in the main track immediately west of the work. The excavation for the abutments is made in many instances in advance of the shovel, the material being thrown in front of the abutment site and then loaded on cars as the shovel passes. Where this is impossible, material is loaded on wagons by hand and used for grading the street approaches to the bridges. Two train crews are employed to handle the cars to and from Bass Lake, each crew spotting its own cars at the shovel. A third crew and engine handle the cars at the yard, using a spreader.

In lowering the tracks, two methods were employed. The first 5,000 ft. of right of way is largely confined between private

A Building Underpinned by a Masonry Wall

property and was not of sufficient width to allow a temporary operating track to be constructed, without one or more shifts, while excavation to the final grade was being made. Excavation was consequently made in stages, the shovel making several cuts while the operating track was shifted several times to lower levels, before reaching its final position. The shovel worked in cuts of a length of about 2,500 ft., which is equivalent to about eight city blocks, with temporary run-offs to meet the original grade of the tracks on grades of from 2.5 to 3 per cent. On the remainder of the work, however, a temporary operating track was constructed along Twenty-ninth street, which is parallel and adjacent to the right of way. This permitted the shovel to operate in the cut unrestricted by regular train movements. After the shovel had started and was in operation, it was necessary to block traffic on seven or eight adjacent streets, until the excavation was completed to the final grade. A temporary timber bridge was then erected at one street to provide for street traffic until some one of the concrete bridges could be constructed and opened to traffic.

At the six streets where street car traffic had to be handled, a temporary bridge for street car traffic spanning the first cut of the shovel was constructed as soon as the shovel had made its first cut across the street. After the shovel passed through for the second time, however, street car traffic was discontinued across the cut and passengers were required to transfer from cars on one side of the cut to cars waiting on the other side,

crossing the cut by steps leading down into the portion excavated in the first stages. As the shovel progressed and the cut became deeper, an overhead foot bridge was provided, which was lowered after each trip of the shovel, until on the approximate grade of the final bridge. The abutments for the bridges carrying street car traffic were, as a rule, in course of construction before street car traffic was discontinued, and the bridge was completed as soon as possible after service was discontinued.

For the first two seasons of work, stationary stiff leg derricks were erected at each bridge site at the original ground level and in such a position as to reach any portion of the structure. This allowed the derrick to be used in erecting the falsework, forms and reinforcing, and for placing the concrete for the whole bridge. During this last season, however, A-frame derricks fitted with hand crabs or hoists were used to erect the falsework and forms. The concrete was then placed from a portable concrete plant, traveling on the construction track at the low level. This consisted of a ½-yd. mixer of the drum type, mounted at the rear of a flat car. Following this was a track pile driver converted into an elevator, using the leads as guides for a specially designed ½-yd. dump bucket with the discharge door at the bottom of the forward side. The concrete was raised and then conveyed to the forms by chutes. The accompanying illustration shows the complete concreting plant in operation. Owing to the similarity of the bridges, unit forms are being employed to good advantage and are being used from three to five times with but slight alterations.

In all, there will be about 900,000 cu. yd. of material excavated about 33,000 cu. yd. of concrete and 900 tons of reinforcing bars will be required for the bridges, abutments and retaining walls.

According to usual practice on the St. Paul, the work is being done by company forces under the direction of C. F. Loweth, chief engineer. The plans are prepared under the direction of H. C. Lothholz, acting engineer of design, and the construction work is in charge of W. R. Powrie, district engineer, Minneapolis.

THE SHIPPING BILL

By W. L. Stoddard

WASHINGTON, DEC. 1

Signs are increasing that the fight for the shipping bill, which is to be one of the most important items in the Administration's program this winter, will be of more than cursory interest to the railroads. The congestion of freight in the east, due to lack of ships, is being used as an argument for government-owned freighters, and in a despatch from Washington early in the week, bearing all the marks of official inspiration, it is declared that the Interstate Commerce Commission, at the suggestion of the President, has been investigating ocean freight rates and the relations between rail carriers in the United States and trans-atlantic steamship companies. Some of the information thus collected, it is declared, reveals close relations between the land and sea carriers, "particularly in matters connected with through freight shipments from interior points to foreign ports. If power is granted to the shipping board to prescribe reasonable rates for steamship traffic, it probably would include the power to fix, possibly in conjunction with the Interstate Commerce Commission, joint through rates from the interior to ports in other countries."

In this connection it may be well to state that from interviews had with officers of the Administration who are in the thick of the work for the shipping bill, it would seem that the bill is almost certain to be received very favorably by Congress. During the last year, so the reports which come to Administration leaders have it, there has been a decided change of sentiment for the measure, and in spite of the opposition, traceable to the foreign shipowners and those who are constitutionally against government ownership, the President's pet scheme will have pleasant, if not absolutely successful, sailing in Congressional waters.

George W. Norris, former director of wharves at Philadelphia, made a statement here the other day which was issued by the Democratic committee as part of the propaganda for the shipping bill. "The conditions which exist in ocean transportation," said Mr. Norris, "and the theory upon which government intervention must be justified, are so wholly different from the railroad situation that there can be neither analogy nor comparison between the two. Moreover, as the government intervention would probably be temporary—ultimately yielding the field to private capital—and would probably show a balance on the wrong side of the ledger, the opponents of government ownership of railroads should rather welcome the experiment as likely to prove an illuminating object-lesson."

Interesting comments on the proposed shipping bill from a New England railroad man, E. D. Codman, former president of the Fitchburg Railroad, are contained in an interview, which is here presented for the first time. Mr. Codman believes that the government merchant marine line offers the only means of overcoming the discrimination enforced by the "shipping pool" against Atlantic seaboard ports.

His statement follows:

"Because I see no other way of relieving Boston of the burden of discrimination laid upon her commerce by the foreign-owned shipping pool, I feel I can endorse the idea of placing in commission a government-owned merchant marine. This government-owned service would seem to be able to deal with the present situation by establishing a fair transportation rate between here and Europe. At the same time it would give ports such as Boston a chance to enter on equitable terms the competition for the trade of South America.

"Take, for example, the rates from this port to Liverpool. We are so much nearer Liverpool than is New York to that English port, that a vessel can make a little better than eleven trips from Boston to Liverpool and back while she would be making ten trips from New York to Liverpool and back. Applied to freight rates, that saving in time should make a difference in our favor, and applied to passengers it should amount to enough to pay a $5 fare from New York to Boston on a first-class passenger.

"Yet under the conditions established by the shipping combine on the Atlantic, the railroads carrying a shipment from Chicago to be sent to Liverpool are allowed practically only the same amount to deliver that shipment on the docks in Boston as to deliver it on the pier in New York. On both exports and imports the rates allowed the railroads are so low as to afford only a slight profit. The fact that there is less profit in bringing shipments by rail to Boston than to New York discourages the railroads from developing their service here. Boston is the victim of this discrimination. Only when her ocean rates to Europe are readjusted on a basis of the shorter distance can she hope to get a fair chance at the export business. The trouble lies in the fact that the foreign-controlled shipping pool has arbitrary control of the rates.

"If the United States government will build and operate, or control the operation of, a merchant marine that will enter upon the task of correcting this injustice, the whole country will be the gainer. The public loses whenever rates are fixed on any other basis than that of a fair price for the service rendered, as in the case of ocean freight transportation. Let the government put on a line of ships temporarily, and the shipping pool will have to meet the rates which a government board shall determine are fair for the distance from Boston to Liverpool.

"I do not believe in government ownership of shipping where private capital can and does render equal service for a fair price. But I do believe that where private capital is so combined, and under control so far removed from the action of public opinion, as is the case with our trans-Atlantic shipping, and where it fails so notably to render to the public a reasonable service at a fair price, the government should step in with its own corrective power. The corrective power in this instance is not the legal regulation of the rates to be charged by the privately owned lines, but the temporary establishing of a shipping line which will set the desired standard of service.

"Boston will be the gainer if this is done."

General News Department

The trains of the Delaware, Lackawanna & Western and the New York, Ontario & Western now run to and from the new passenger station of the New York Central at Utica, N. Y., making that the union station for the city.

The Denver & Rio Grande announces that after the end of this year the dining cars of that road will carry no intoxicating liquors. This rule is to apply not only in Colorado, where a prohibitory law goes into effect on January 1, but also in Utah and New Mexico.

A. D. Parker, vice-president of the Colorado & Southern, has announced that contracts covering the handling of business for the Colorado Midland between Denver and Colorado Springs over the Colorado & Southern, will be terminated on May 1, as part of a plan to rearrange division points.

Homer B. Vanderblue, assistant professor of transportation at Northwestern University School of Commerce, has been awarded the second prize of $500, awarded annually by Hart, Schaffner & Marx, for essays on economic subjects. Mr. Vanderblue's paper was on the subject of "Railroad Valuation."

The Massachusetts Public Service Commission is making another investigation of the capital, expenditures and investments of the New York, New Haven & Hartford, and will assess the cost of it, up to $10,000, against the company. Accountants are examining the company's books and a public hearing will be given by the commission on December 7.

The Coconino Water Development and Stock Company, recently organized in Arizona, proposes to lay 200 miles of pipe to supply water to the desert stations on the line of the Atchison, Topeka & Santa Fe between Ash Fork and Angell, about 90 miles, and also to the tourist resort towns on the rim of the Grand Canyon. The water is to be obtained by drilling wells on the slope of San Francisco Peak, about 10 miles north of Flagstaff.

The legislature of Georgia, which has just finished an extra session, has created a commission of five persons to have power to lease the Western & Atlantic Railroad, owned by the state. The chairman of the commission is Governor N. E. Harris and another member is C. M. Candler, chairman of the State Railroad Commission. The Western & Atlantic is now operated by the Nashville, Chattanooga & St. Louis under a lease which expires in 1919.

A. W. Newton, assistant to president of the Chicago, Burlington & Quincy, has been appointed chairman of the Engineering Committee, western group, Presidents' Conference Committee for the Federal Valuation of the Railways, succeeding H. C. Phillips, who was appointed assistant general secretary of the Presidents' Conference Committee some time ago. C. F. Loweth has been made a member of the Engineering Committee, western group, Presidents' Conference Committee.

R. C. Richards, chairman of the Central Safety Committee of the Chicago & North Western, in issuing a bulletin to employees calling for more general use of postal cards prepared by the division safety committee, on which employees or patrons are invited to make suggestions for making railroad operation safer and more satisfactory to the public, calls attention to the fact that from January 1, 1911, to September 1 last, 24,176 recommendations were made on the safety postal cards and otherwise, of which 23,502 were adopted and have already been put into effect.

Indictments were returned last week by the federal grand jury at Kansas City against the St. Louis & San Francisco and the Union Pacific railroads and the Western Tie & Timber Company, of St. Louis, charging an illegal reduction by which the timber company paid less than the lawful tariff rates for transportation of oak ties. The president of the timber company has given out a statement that the reduction of the rates arose from a readjustment of divisions between the two railroads, and that according to the traffic departments and attorneys the proper rate was paid.

The Southern Railway, as a result of two years' attention to the education of special apprentices, has now in its employ, in the roadway department, 13 student apprentices, of whom seven have been promoted to the position of assistant supervisor. The company seeks to enlist in its service young men of technical training, who were born and bred in the South, and is at all times looking out for graduates of the leading southern universities. Special attention is given not only to scholastic attainment but also to personality, as judged by teachers and fellow students; and special consideration is accorded also to men who wholly or in part have paid their own way through college. Students have to begin on the road as common section laborers.

Victor Carlstrom, a Swede, riding in a Curtiss biplane of a new type, with a motor of 160 h.p., flew last week from Toronto, Ont., to New York City, by a route said to be about 600 miles long, in 400 minutes, or at the rate of 90 miles an hour. This, however, was not the inclusive time, as the aviator was compelled to stop over at Binghamton because of dizziness, due partly to a strong wind and partly to ill health. The 6 hours and 40 minutes represents the time actually on the wing. Most of the journey was made at a height of about 5,000 ft. The railroad lines of the Delaware, Lackawanna & Western and the Erie were the aviator's guides for most of the way. He started with 146 gallons of gasolene and with a total dead weight of about 960 lb.

The attorney-general of Texas proposes to get a receiver appointed for the Pacific Fruit Express in order to compel payment of a large sum of money which is alleged to be due on account of a tax of 3 per cent on its gross receipts from intrastate business since October 1, 1909—if the court grants the application which has been filed. The Pacific Fruit Express has no permit to do business in Texas, but its cars have been run extensively in the state for many years. If the officers accept service and come into court there will be a straight contest of the legal right of the state to tax the gross receipts of private car lines. Cars of a large number of private car lines are run in Texas, but it is said that very few of them have observed the gross-receipt tax law.

The Western Association of Short Line Railroads, with office in San Francisco, is conducting a publicity campaign in the interest of an increase in railway mail pay, and is sending to newspapers articles giving information regarding the effect of the present low rates on the short line railroads. The association says that "this matter is most vital to the little railroads in the mountain districts and the Pacific coast. These roads are none of them prospering, most of them are losing money, and a few are in the hands of a receiver. The association is composed of these small roads. We think that the government should be as fair to us as other shippers, and we believe that rates for mail pay should be fixed by the Interstate Commerce Commission."

Smoke Abatement in Chicago

The report of the Chicago Association of Commerce Committee on smoke abatement, which was presented at a dinner at Chicago, December 1, is reported in another column. The report was presented by Judge Jesse Holdom of the Illinois Appellate Court, as chairman of the committee. Harry A. Wheeler, vice-president of the Union Trust Company, spoke on the "History and Problems of the Committee." Harrison B. Riley, president of the Chicago Title & Trust Company, spoke on the "Arguments and Conclusion of the Report," and Charles L. Dering, president of the Chicago Association of Commerce, accepted the report on behalf of the association.

Committee on Prevention of Accidents at Highway Crossings

At the recent meeting of the American Railway Association, on the recommendation of the executive committee, the president appointed a Special Committee on the Prevention of Accidents at Grade Crossings, consisting of seven members, with James A. McCrea, general manager of the Long Island, as chairman, representing the railroads of the country territorially to consider the whole question. The other members of the committee are J. Q. Van Winkle, assistant to general manager, Cleveland, Cincinnati, Chicago & St. Louis Railway; C. L. Bardo, general manager, New York, New Haven & Hartford; L. E. Jeffries, general attorney, Southern; Howard Elliott, San Pedro, Los Angeles & Salt Lake; W. J. Towne, assistant general manager, Chicago & North Western, and W. R. Scott, vice-president and general manager, Southern Pacific.

St. Paul Electrification Tests

On November 13 the Chicago, Milwaukee & St. Paul made a test of one of the new electric locomotives which has just been received for operation on the Rocky Mountain division. This test was made on the tracks of the Butte, Anaconda & Pacific, as power is not yet available on the St. Paul. This locomotive, weighing 284 tons, took an ore train with 4,660 tons trailing load down a 1 per cent grade from Butte at a maximum speed of 25 miles an hour, reducing to 16 miles an hour on a portion of the line with heavy curvature and to a minimum of 7 miles an hour. Regenerative braking was applied on the descending grade, returning 21 per cent of the current to the line. As there was only 2,200 volts on this line at the time the test was made and as the St. Paul line will operate at 3,000 volts, it is estimated theoretically that on this basis 52.5 per cent of the power would have been returned on the St. Paul line on the 2 per cent mountain grade or 38.1 per cent on a 1 per cent grade. This same locomotive took this train up a 0.4 per cent grade into Anaconda on this low voltage. Three locomotives have now been received. Additional exhaustive tests of the locomotives will be conducted on the 2 per cent grades over the Rocky Mountains next week.

Street Accidents in New York City

The New York State Public Service Commission, First District, reports a marked decrease in casualties to persons on railroads and street railroads in that district [New York City, population about 5,000,000] for the month of October, 1915. Only 12 persons were killed during the month, which is the smallest total in the history of the Commission. The largest number of fatalities ever reported, 67, was in September, 1907. This was within three months after the creation of the Public Service Commission and two years before the Commission issued orders for the installation of efficient fenders and wheelguards on street surface railroad cars. These devices, together with the improved types of cars installed by the companies, the installation of air brakes, and quite recently the establishment of the near-side stop for street cars, have resulted in materially reducing the number of fatal accidents. When the Commission was created the number of persons killed ranged from 500 to 600 a year. This has been practically reduced 50 per cent, though there has been a great increase in traffic. Of the total of 5,395 accidents 3,920 occurred on surface lines, 950 on subway and elevated lines, 509 on standard railroad lines, 12 on railroad terminal [freight] and 3 on motor bus lines. Of the killed 6 met death on the surface lines, 4 on the subway and elevated lines, 1 on railroad lines and 1 on a railroad terminal line.

Strict Discipline

The Altoona Tribune reports, evidently on authentic information, that 28 employees of the Pennsylvania Railroad were disciplined during the week ending November 14 by the superintendent of the Middle division.

For running past a stop signal, a passenger engineman was suspended a week, and another was reprimanded for failing to stop and report a medium-speed signal light out. Overlooking orders brought a trip suspension for a passenger engineman and a reprimand for his fireman. A passenger conductor was suspended two days for failing to look after his train properly, another was suspended two days for failing to notify his engineman of restricted speed. For failing to make proper car record report, one freight conductor was reprimanded. For intoxication off duty, a yard conductor was suspended two weeks, and another was reprimanded for failing to deliver manifests. A third yard conductor was reprimanded for despatching a train without manifest, while a yard flagman was reprimanded for sitting on rail. A passenger fireman was reprimanded for improper firing and a freight fireman was suspended a trip for collision.

Reprimands and suspensions of brakemen were imposed as follows: A passenger brakeman for starting train before car was loaded; a yard brakeman for drinking off duty and making false statement about the offense; for draft collision, five brakemen reprimanded; leaving work without permission, yard brakeman suspended; and sleeping on duty, one telephone exchange operator demoted to position of extra telephone operator.

The New Haven Trial

Charles S. Mellen, testifying for the government in the trial in the Federal Court in New York on Monday last, said that John L. Billard, the Meriden coal dealer, was such a good friend to the New York, New Haven & Hartford that if "my directors had asked me to take a pound of flesh out of him, he would have willingly gone off bleeding." Mr. Billard, as noted in last week's issue, held a large block of Boston & Maine shares for the New Haven for more than a year and then sold it back to the latter. Mr. Billard, it appears, willingly gave up a nominal profit of $2,750,000 for an actual profit of $150,000. The New Haven settled with him, in 1909, for $450,000, but he gave up $300,000 of it to Frank Brown, a Connecticut lawyer who had helped him to get the charter of the Billard Company and wanted, according to Mr. Mellen, to give $50,000 to him. After this settlement, Billard endorsed the stock of the Billard Company to Mr. Mellen and the latter held it for two years when it was turned back to Mr. Billard.

A large part of the session on Tuesday was devoted to a discussion as to whether the government should be allowed to submit testimony concerning the New York, Westchester & Boston. This road is entirely an intrastate road, its mileage all being in the state of New York. The government contends that, under the company's charter, it was projected into Connecticut for the purpose of operating a through line into New England and that control was sought by the New Haven to prevent dangerous competition. R. V. Lindabury, for the defence, argued that the route set forth in the charter was re-located and that not only was the road not built beyond the New York state line, but was not so projected when the New Haven acquired control.

Judge Hunt, after hearing an hour and a half of argument, reserved decision.

On Wednesday the matter of the Westchester evidence was again taken up, Judge Hunt finally holding that all reference in regard to the road must be excluded. This is an important element in favor of the defence.

Government Ownership Too Near Home

(From an Editorial in the New York Commercial)

Once in a while the light breaks in on the most rabid advocates of public ownership. A daily paper of large circulation in New York city essays to occupy the field of champion of public ownership of all public utilities from railroads down to "jitney" cabs, but once in a while its editor receives a slap on the wrist from some federal or municipal clerk and then he talks right out in school. Something of the kind happened over in Brooklyn the other day and the champion of public ownership, of the sacredness of the civil service list and of the irrevocable rights of policemen to hold their jobs, now calls for somebody's head.

Having investigated complaints concerning the attitude of employees in the Brooklyn Department of Licenses this newspaper says editorially, "these superior gentlemen look down contemptuously upon men and women who appear before them," and it reminds them that they are paid and hired by the people and are not occupying hereditary offices. They are reminded that various things might happen to them, such as the discovery of the possibility of reducing their number and getting better work from those remaining by a little judicious discipline. The commissioner is asked to interest himself in this matter, for, as our contemporary very truly says, "the first thing to do is to make the

government respectable in the person of the officials with whom foreigners deal."

If the president of some great corporation said such things he would be hauled over the coals by the newspaper that printed "those cruel words." If an employe of a public service corporation should make a slip the corporation would have to go with him if this newspaper would have its say. But, if such a complaint based on sufficient evidence were made by this newspaper or any citizen, any public service corporation or any store would dismiss the offending employe on the spot.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 2-5, 1916, Atlanta, Ga.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, January, 1916, Atlanta, Ga.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D., L. & W., Hoboken, N. J.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Next meeting, June 20-23, 1916, Cincinnati, O.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 17, 1915, The Blackstone, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 17-19, 1916, New Orleans, La.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 21-23, 1916, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June, 1916.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July, 1916.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 7-10, 1915, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 18-20, 1916, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms, 1116-8, Woodward Bldg., Washington, D. C. Annual meeting, June 28, 1916, Hotel Statler, Detroit, Mich.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association. Annual convention, October, 1916, Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, N. Y. C., 3842 Grand Central Terminal, New York. Next meeting, May 19, 1916, Atlantic City, N. J.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 20-22, 1916, St. Paul, Minn.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conrad, 75 Church St., New York. Next meeting, December 14-15, 1915, St. Louis, Mo.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—T. O. Jacobs, H. W. Johns-Manville Co., Chicago. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual session, May 17, 1916, Washington, D. C.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May, 1916, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Next meeting, August, 1916, Chicago.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York, Annual convention, May 23-26, 1916, Hotel Hollenden, Cleveland, Ohio.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next annual meeting, September 12-14, 1916, Wilmington, Del.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June, 1916.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 349 People's Gas Bldg., Chicago. Next convention, March 1916, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala.

RAILWAY REAL ESTATE ASSOCIATION.—Frank C. Irvine, 1125 Pennsylvania Station, Pittsburgh, Pa. Annual meeting, October, 1916, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next annual convention, September, 1916, Grand Hotel, Mackinac Island, Mich.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collingwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling Ill. Next annual convention, September 19-22, 1916, New York.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta Ga. Next meeting, April, 1916.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramaco Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—Roy S. Bushy, Firemen's Bldg., Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings, bi-monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings, October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 21, 1916, Toronto, Ont.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Next meeting, September, 1916, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—E. M. Layfield, 1735 Monadock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

President Fred Zimmerman and a delegation of members of the Chicago Traffic Club called on President Wilson on November 19, to invite the President to address the club at its ninth annual dinner to be held in Chicago on a date yet to be chosen. The President has taken the matter under advisement and will give the club his answer at a later date.

In an announcement of new Florida passenger train service in our issue of November 19, page 978, the schedule of the "Royal Palm," the train between Chicago and Jacksonville via the Southern, Queen & Crescent and Big Four, was incorrectly stated. On November 21, the schedule of this train was changed to leave Chicago at 10:05 p. m., arriving at Jacksonville at 7:40 the second morning.

The "Dixie Limited" train, running between Chicago and Jacksonville, Fla., over the Chicago & Eastern Illinois, Louisville & Nashville, Nashville, Chattanooga & St. Louis, Central of Georgia, Georgia Southern & Florida and Atlantic Coast Line, will be put in service for the winter on January 10, leaving Chicago at 11:30 a. m., and arriving at Jacksonville at 7:30 p. m., the second day. Northbound, the train leaves Jacksonville at 9:35 a. m. and arrives at Chicago at 5:55 p. m.

Merchants of Atlanta, Ga., have started a campaign against increases in freight rates, from northern points to southestern cities, recently granted the railroads by the Interstate Commerce Commission; and at a meeting, on Tuesday last, the wholesalers, retailers and jobbers agreed on the appointment of a committee to raise $10,000 to finance the project. Attorneys have been retained to ask the suspension of the proposed rates, which would go into effect January 1. The merchants declare that the new rates, if they become effective, will cost Atlanta shippers $500,000 a year above their present freight bills. They say that the railroads are preparing also to advance intrastate freight rates, and this they will oppose.

During the month of September, as in August, the expenses charged to the operation and maintenance of the Panama Canal were in excess of the tolls collected on vessels making use of the canal, according to the Canal Record. The shortage was $63,177. During September, 1914, the second month of canal operation, the tolls exceeded the cost of operation and maintenance by $63,601. The shortage was caused by the closing of the canal on account of slides during nearly one-half of the month. More than one-half of the total charges for operation and mainteance in September, 1915, represents the cost of dredging operations, which amounted to $259,604, as compared with $31,545 in September, 1914.

The traffic officers of the Missouri railroads held a conference at St. Louis on November 23, to consider the decision of the Missouri Public Service Commission, allowing general increases in freight and passenger rates, and adjourned subject to the call of the chair, Thomas R. Morrow, solicitor for Missouri of the Atchison, Topeka & Santa Fe. Three committees were appointed, with Joseph Bryson of the Missouri, Kansas & Texas, as chairman of the legal committee; J. M. Johnson of the Missouri Pacific, chairman of the freight committee, and Alexander Hilton of the St. Louis & San Francisco, chairman of the passenger committee, to study the decision in comparison with the present rates, and render a report at the subsequent meeting on the effect of the decision in detail. The commission has changed the effective date of the new rates from January 1 to January 20.

Increase of Fares on the New York Central

The New York Central has notified the New York State Public Service Commission that local one-way passenger fares in that state will be advanced on January 1 to the basis of 2½ cents a mile, except between Albany and Buffalo, on the main line, where the rates are limited by charter to two cents a mile. Between New York City and Albany, 142 miles, the advance is from $3.10 to $3.58.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Import Rates on Brewers' Rice

Opinion by Commissioner Clark:

Because of informal complaints filed with the commission, to determine the propriety of the import rates on brewers' rice from gulf ports to various destinations which were lower than the domestic rates, a hearing was had under a general order of the commission which provides for an investigation into the relationship between import and domestic rates.

The commission finds that since the import rates on brewers' rice from gulf ports are not made with relation to the domestic rates, but are controlled by and made differentials under the import rates on brewers' rice from north Atlantic ports, the circumstances surrounding those rates are substantially dissimilar from those surrounding the domestic rates, and that the allegation of discrimination, except where the differential in import rates is greater than the recognized differentials between the gulf ports and the north Atlantic ports, has not been proven.

It also holds that the relationship between the import and domestic rates on brewers' rice from gulf ports to Pueblo, Colo., Salt Lake City, Utah, and other points at which similar rate relationships obtain, is unjustly discriminatory, and that where defendants maintain from the gulf ports import rates on brewers' rice that are more than 6 cents lower than the import rates from New York to the same points, it is discriminatory to charge higher rates on domestic than on import shipments. (36 I. C. C., 389.)

Rates on Bituminous Coal to Mississippi Valley Territory

Brownville Cotton, Oil & Ice Company v. Louisville Nashville. Opinion by the Commission:

This proceeding involves a petition by the carriers to be allowed to continue to charge rates on coal from mines in Illinois, Kentucky, Tennessee and Alabama to points in Mississippi valley territory that are lower than rates on like traffic to intermediate points.

The mines in Illinois from which these rates apply are situated in the southern part of that state and are served by the Mobile & Ohio and Illinois Central. The mines in Kentucky are divided into two groups, one of which, known as the eastern group, is in the extreme eastern portion of that state, and the other, known as the western group, is in the western-central section of the state. The principal lines operating from these mines to Mississippi valley territory are the Illinois Central and the Louisville & Nashville from the western group, and the Louisville & Nashville from the eastern group. The Tennessee mines are situated in the eastern part of that state on the lines of the Southern, the Louisville & Nashville and the Nashville, Chattanooga & St. Louis. The mines in Alabama are situated for the most part in the northwestern portion of that state. The lines from these mines to Mississippi valley points are the Southern, the Northern Alabama, the Illinois Central, the St. Louis & San Francisco, the Mobile & Ohio and the Alabama Great Southern and their connections.

The territory of destination described as Mississippi valley territory consists of all that section of the United States east of the Mississippi river and south of the Ohio river lying on and west of a line formed by the Nashville, Chattanooga & St. Louis from Paducah, Ky., to Paris, Tenn., the Louisville & Nashville from Paris to Milan, Tenn., the Illinois Central from Milan to Jackson, Tenn., the Mobile & Ohio from Jackson to Mobile, Ala., and includes also stations on the line of the Mobile & Ohio east of West Point, Miss., to and including Columbus, Miss.

The commission's findings are as follows:

The carriers are authorized to continue lower rates to Memphis, Tenn., Natchez, Miss., Baton Rouge, Bayou Sara, Plantation group, Kenner and New Orleans, La., and group, Gulfport, Miss., and Mobile, Ala., than to intermediate points.

They may continue rates from mines in Illinois and Kentucky to Greenville and Vicksburg, Miss., lower than rates to intermediate points.

Authority to continue rates on coal via indirect routes from mines in Illinois, Kentucky, Tennessee and Alabama to junction and common points in Mississippi valley territory lower than rates to intermediate points is granted.

Authority to continue rates on coal from mines in Illinois and Kentucky to Bemis, Gibbs, Humboldt, Jackson, McKenzie, Milan, Paris, Union City, Martin and Rives, Tenn., lower than rates to intermediate points is denied.

Authority to continue rates via direct lines from Alabama mines to Aberdeen, Ackerman, Columbus, Ellisville, Enterprise, Hattiesburg, Holly Springs, Jackson, Laurel, Newton, Meridian, Starkville, Vicksburg and West Point, Miss., and Grand Junction and Middletown, Tenn., lower than rates to intermediate points is denied.

Reasonable maximum rates on bituminous coal from mines in Illinois, Kentucky and Alabama to Dyersburg, Tenn., Grenada, Oxford and Kosciusko, Miss., and other points are prescribed. (36 I. C. C., 401.)

Extension of Time to Comply with Safety Appliance Acts

The commission has granted a further extension of 12 months from July 1, 1916, to the time within which the carriers must make their freight train cars conform to the safety appliance acts. By an order of the commission dated March 13, 1911, issued in conformance with an act of Congress approved April 14, 1910, the carriers were allowed an extension of time of five years from July 1, 1911. By the present order the former order is extended one year.

The commission's order of March 13, 1911, was as follows:

(*a*) Carriers are not required to change the breaks from right to left side on steel or steel underframe cars with platform end sills, or to change the end ladders on such cars, except when such appliances are renewed, at which time they must be made to comply with the standards prescribed in said order of March 13, 1911.

(*b*) Carriers are granted an extension of five years from July 1, 1911, to change the location of brakes on all cars other than those designated in paragraph (*a*) to comply with the standards prescribed in said order.

(*c*) Carriers are granted an extension of five years from July 1, 1911, to comply with the standards prescribed in said order in respect of all brake specifications contained therein, other than those designated in paragraph (*a*) and (*b*), on cars of all classes.

(*d*) Carriers are not required to make changes to secure additional end-ladder clearance on cars that have 10 or more inches end-ladder clearance, within 30 inches of side of car, until car is shopped for work amounting to practically rebuilding body of car, at which time they must be made to comply with the standards prescribed in said order.

(*e*) Carriers are granted an extension of five years from July 1, 1911, to change cars having less than 10 inches end-ladder clearance, within 30 inches of side of car, to comply with the standards prescribed in said order.

(*f*) Carriers are granted an extension of five years from July 1, 1911, to change and apply all other appliances on freight cars to comply with the standards prescribed in said order, except that when a car is shopped for work amounting to practically rebuilding body of car, it must then be equipped according to the standards prescribed in said order in respect to handholds, running boards, ladders, sill steps, and brake staffs: *Provided*, That the extension of time herein granted is not to be construed as relieving carriers from complying with the provisions of section 4 of the act of March 2, 1893, as amended April 1, 1896, and March 2, 1903.

(*g*) Carriers are not required to change the location of handholds (except end handholds under end sills), ladders, sill steps, brake wheels, and brake staffs on freight-train cars where the appliances are within 3 inches of the required location, except that when cars undergo regular repairs they must then be made to comply with the standards prescribed in said order.

The petitioning roads operate a large percentage of the total railway mileage of the United States. A hearing was had at Washington, D. C., on September 28, 1915.

It is urged as a principal basis for relief that the carriers have acted in good faith and have made an earnest effort to comply with the commission's requirements, but that because of the financial and, to a certain extent, the physical difficulties involved, they will not be able fully to meet these requirements within the prescribed time. The proceeding involves only freight cars, locomotives and passengers having been made to comply with the act within the required time.

Out of a total of 2,025,254 cars in service on July 1, 1911, on roads having a total mileage of about 232,000 miles, it is estimated by the carriers that 1,669,064 cars, or about 82 per cent, will be either equipped in accordance with the order or removed from service by July 1, 1916, leaving about 356,000 cars still unequipped on that date. No information is available which will show, for the purpose of comparison, the yearly progress made in equipping the above 1,669,064 cars. The following table, however, compiled from data submitted by the carriers indicates the progress of equipment with respect to 89 lines having a total mileage of 203,652 miles and an individual mileage of approximately 300 miles or over, and will perhaps afford a more comprehensive view of the general situation:

Cars in service July 1, 1911	1,849,222
Cars equipped year ended June 30—	
1912	122,213
1913	283,599
1914	315,184
1915	336,938
Total cars equipped June 30, 1915	1,057,934
Estimated number of cars to be equipped or removed from service year ending June 30, 1916	483,432
Estimated number of cars equipped by July 1, 1916	1,541,366
Estimated number of cars unequipped on July 1, 1916	307,856

It thus appears that about 57 per cent of the above cars were equipped on June 30, 1915, and that it is estimated that about 83 per cent will be either equipped or removed from service by July 1, 1916.

It may be conceded that the year ending June 30, 1914, was an abnormal one in railroading and that the general business depression during that period had a marked effect upon the volume of traffic, resulting in a large decrease in revenue. Notwithstanding these conditions it appears that, while there are a number of exceptions as to individual roads, the figures as a whole show a gradual increase in the number of cars equipped during each successive year and that the greatest number of cars was equipped in 1914 and 1915. It is perhaps proper to take into consideration that some time was consumed in making the necessary preparation and preliminary plans for an undertaking of this magnitude, involving, it is stated, an expenditure of about $45,000,000. It is also doubtless true that as the carriers gained a more thorough working knowledge of the requirements they were in a position to equip a large number of cars in a given period.

It is asserted that unless a further extension is granted over a third of a million freight cars must be withdrawn from service until such time as they can be equipped and that this will result in congestion on storage and repair tracks and in hardship and inconvenience to the shipping public as well as to the railroads.

In view of these latter considerations and of the progress made under all circumstances by the carriers as a whole, the commission believes that sufficient cause exists for some further extension, though it is not convinced on the showing made that many of those roads which will still have a large percentage of unequipped cars on July 1, 1916, could not, by the exercise of somewhat more diligent effort and without undue hardship, have made considerably greater progress.

The commission believes that a sufficient extension of time would be 12 months. The order applies only to paragraphs (b), (c), (d) and (f). As to the matters in the other paragraphs the carriers have already been granted an indefinite extension of time. (36 I. C. C., 371.)

STATE COMMISSIONS

The Chicago & North Western, Chicago, Milwaukee & St. Paul, Chicago, St. Paul, Minneapolis & Omaha, and Minneapolis, St. Louis & Sault Ste. Marie have filed petitions with the Wisconsin Railroad Commission asking authority to increase freight rates within the state.

Attorneys for the receivers of the Missouri & North Arkansas have filed a motion with the Missouri Public Service Commission for a rehearing and modification of the commission's recent decision authorizing a limited increase of passenger and freight rates in Missouri. The petition declares that the rates allowed by the commission will not yield enough revenue to the Missouri & North Arkansas to enable it to maintain service.

The Louisiana Railroad Commission, after an investigation, has granted the application of the Illinois Central for authority to discontinue Frenier, La., as an agency station. Investigation showed that the storm on September 29 destroyed the entire settlement and all of the company's facilities at that point. All vestige of the little settlement in and around the station has been destroyed and the people formerly living there have either been drowned or have moved away.

The Louisiana Railroad Commission has ordered a general

investigation of the collection by conductors on passenger trains of one cent a mile additional, with a maximum of 10 cents, when tickets are not bought. The commission is thinking of prohibiting such penalties. The commission has also ordered a general investigation with a view to requiring railroads in the state to issue interchangeable excess baggage coupon books, or to accept penny script coupons for excess baggage between points in the state.

The contract of the New York, New Haven & Hartford and the Boston & Maine with the Joseph, Joseph & Brothers Company of Cincinnati, by which the railroads are selling their scrap iron to the Cincinnati firm for about $1,500,000 a year, is being investigated by the Massachusetts Public Service Commission, on the complaint of Perry, Buxton & Doane Company of Boston, another junk dealer. The New Haven has decided not to renew the contract for next year. The Boston & Maine has not renewed its part of it, but defends it as being the most businesslike method for the disposal of its scrap.

COURT NEWS

The Wabash has filed a petition in the Missouri Supreme Court for a writ of mandamus to compel the secretary of state to issue a license to the new company to operate in Missouri. The secretary of state recently refused to do so on the ground that the laws of the state require the company to be incorporated in Missouri.

Free Pass Invalid

The Pennsylvania Superior Court holds that an agreement in the nature of a free pass for life between a railroad company and a prospective shipper is invalid where the consideration mentioned is $1.00, and the proof is to the effect that the pass was merely a gratuity in recognition of past kindnesses—Pittsburgh & Lake Erie v. Peterson, 58 Pa. Sup. Ct. 44.

Fires—Right to Pile Wood on Right of Way

Action was brought against a railroad for damages for negligently burning two buildings adjoining the company's right of way. The fire started in the station, spread to a pile of seasoned pine, which had been delivered for shipment and was waiting until cars were ready. From this the fire appeared to have extended to the plaintiff's buildings. The only negligence relied on was permitting wood [lumber] to remain on the right of way. The North Carolina Supreme Court held that, as wood is a recognized and necessary commodity, with no extra hazards in its transportation or shipment, and as the railroad was compelled by law to receive it, and could only store it on its right of way, in the absence of evidence that the wood was placed at an improper place or improperly piled, there was no evidence of negligence.—Kemp v. Norfolk Southern (N. Car.) 86 S. E. 621.

Void Commission Order to Connect With Another Road

The St. Louis & San Francisco was convicted and fined for failing to obey an order of the Arkansas Railroad Commission to maintain a joint interchange track with the Kansas City & Memphis at Fayetteville. The order was based on a petition signed by 17 corporations and partnerships and one natural person. The Arkansas Supreme Court, on appeal, held the order to be void, as not being signed by 15 bona fide citizens residing within the territory affected, within the direct terms of the statute, since "bona fide citizens," as there used, means permanent residents as distinguished from sojourners, and refers to individuals to the exclusion of corporations and copartnerships.—St. Louis & S. F. (Ark.) 179 S. W. 342.

Consignor's Right to Sue

A consignor of lumber shipped on a straight bill of lading sued for negligence in transportation, attempting to prove that he had thereby been compelled to pay additional and increased freight charges. The only proof of this was a paid freight bill, which did not show whether it was paid by the consignor or the consignee. As goods thus shipped became the property of the consignee at the time of delivery to the railroad, nothing else appearing, he is prima facie liable for the freight, and in the absence of proof to the contrary it would be presumed that he paid it. The North Carolina Supreme Court therefore held that the consignor was not entitled to recover.—Ellington & Guy v. Norfolk Southern (N. Car.) 86 S. E. 693.

Noncompliance With Headlight Statute

Action was brought for personal injury to an employee of an express company, who, in the course of his duty, was walking near a track in the Chicago & North Western's station in Milwaukee. As he knew, a train was past due, and he was hurrying. It was at night and the station was well lighted. The train came in and he was struck from behind by the pilot of the engine. Violation of the Wisconsin headlight statute was charged. The trial court directed a verdict for the defendant on the ground of contributory negligence, holding also that the headlight statute was so indefinite and uncertain as to be impracticable of enforcement, and was therefore void.

On appeal, the Wisconsin Supreme Court did not consider the question of the constitutionality of the headlight statute, holding that the vicinity of the accident must have been so brilliantly lighted by the nine arc lights that no more efficient headlight was necessary, and insufficient headlights had no casual connection with the damages claimed. The judgment against the employee was affirmed.—Smith v. C. & N. W. (Wis.) 154 N. W. 623.

Release of Railroad's Liability by Pullman Car Cook

Action was brought for the death of a Pullman car cook, alleged to have been caused by the negligence of the C., B. & Q. in operating its railroad in the state of Colorado. The cook's employment contract, in the Pullman company's usual form, was executed in Pennsylvania. It obligated the deceased to go wherever he was required in the service, and he renounced the rights of a passenger. The deceased was in no sense an employee of the railroad.

If the contract of employment and the release had been in Colorado, they would have been a complete defense in a suit for injuries not resulting in death. Both under the Colorado decisions and the federal decisions interpreting the common law, the deceased was not a passenger. An agreement that, in consideration of employment with the Pullman Company, the railroad should under no circumstances be liable for injuries or death of a Pullman Company porter not an employee of the railroad has been held to be not against public policy, and to cover injuries caused by the negligence of the railroad's employees, even though such negligence is not specifically mentioned in the contract. Denver & Rio Grande v. Whan, 39 Colo., 230, 89 Pac. 39; Robinson v. B. & O., 237 U. S. 84. The last point was expressly decided in Russell v. P., C. C. & St. L., 157 Ind. 305, 61 N. E. 678.

The plaintiff contended, however, that though the law of Colorado, where the tort was committed, governed the right of action, the employment contract and release were void in Pennsylvania, where executed, and therefore could not be availed of in defense in any jurisdiction. The Circuit Court of Appeals, Seventh circuit, pointed out that the Pennsylvania courts do not declare such a release null and void, even if made in Pennsylvania, but merely hold it contrary to the public policy of the state, and therefore unenforceable as a defense when the tort is committed in Pennsylvania; and that, too, though the release was valid where executed. On the other hand, if the injury occurred in a state which recognized the release as valid, the Pennsylvania courts enforce it, even though the contract was made in Pennsylvania. Moreover, the validity of the release as a defense in an action of tort is governed by the law of the place of injury. And, as Colorado has no statutory provision relating thereto, the federal courts, interpreting the common law, would, in any event, enforce the release as a bar for damages arising from the negligence in Colorado of the railroad's employees.

The Colorado statute as to wrongful death gives a right of action whenever the death of a person shall be caused by wrongful act, neglect or default of another, and the act is such as would, if death had not ensued, have entitled the party injured to maintain an action for damages. As the widow's action, therefore, was maintainable only if the deceased could have brought action if death had not ensued, the release constituted a bar to her suit.—Lindsay v. Chicago, Burlington & Quincy, C. C. A., 226 Fed. 23.

Railway Officers

Executive, Financial, Legal and Accounting

H. D. Pollard has been elected president of the Wrightsville & Tennille, succeeding A. F. Daley, deceased.

H. P. McMillan has been appointed auditor of the San Antonio, Uvalde & Gulf, with office at San Antonio, Tex., vice T. S. Ford, resigned.

Edgar W. Sprague has been appointed assistant general claim agent of the Yazoo & Mississippi Valley with office at Memphis, Tenn., effective December 1.

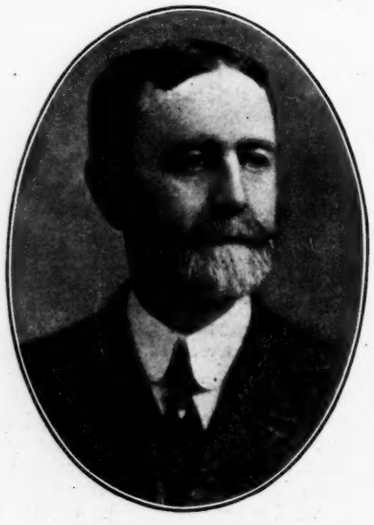
Charles A. Leggo has been appointed assistant secretary of the Chicago, St. Paul, Minneapolis & Omaha, with office at Hudson, Wis. Effective December 1.

William Mueller has been appointed assistant tax commissioner of the Chicago, St. Paul, Minneapolis & Omaha, with office at St. Paul, Minn. Effective December 1.

John D. Caldwell, assistant secretary of the Chicago, St. Paul, Minneapolis & Omaha at Chicago, Ill., has been elected secretary with office in the same city. Effective December 1. He is also secretary of the Chicago & North Western.

T. A. Polleys, secretary and right of way and tax commissioner of the Chicago, St. Paul, Minneapolis & Omaha at Hudson, Wis., has been appointed tax commissioner of the Chicago & North Western and the Omaha, with office at Chicago, Ill., vice F. P. Crandon, retired under the pension rules. Effective December 1.

B. A. Worthington, who has been elected president of the Cincinnati, Indianapolis & Western, was born on November 20, 1861, at Sacramento, Cal. He was educated in the public schools at Sacramento and entered railway service on July 1, 1874, as telegraph messenger of the Central Pacific, now part of the Southern Pacific, at Sacramento, and later was telegraph operator of the same road. From 1877 to 1882 he was commercial operator of the Western Union Telegraph Company and then to 1888 he was chief clerk and secretary to the general master mechanic of the Southern Pacific at Sacramento. From 1888 to 1895 he was chief clerk and secretary to the vice-president and general manager of that road at San Francisco, Cal. In July, 1895, he became chief clerk and secretary to the assistant to the president, and from 1898 to 1901 he was in charge of tonnage rating of locomotives on that road. In July, 1901, he was appointed superintendent of the Tucson division of the Southern Pacific at Tucson, Ariz. In October of the same year he became superintendent of the Coast division, with headquarters at San Francisco, and from August 20, 1903, to April 1, 1904, he was assistant to Julius Kruttschnitt, general manager at San Francisco. From April 1, 1904, to February, 1905, he was assistant director of maintenance and operation of the Harriman Lines (Southern Pacific and Union Pacific Systems) at Chicago. He was then elected vice-president and general manager of the Oregon Railroad & Navigation Company, and from June 1, 1905, to June, 1908, he was first vice-president of the Wheeling & Lake Erie, the Wabash-Pittsburg Terminal Railway and the West Side Belt Railroad, comprising the Wabash lines east of Toledo, O. From September, 1905, to June, 1908, he was also general manager of the same lines. In June, 1908, he became receiver of the Wheeling & Lake Erie, with office at Cleveland, O. On July 1, 1912, he was elected president and general manager of the Chicago & Alton, and later became president of the Lorain & West Virginian.



B. A. Worthington

Henry B. Hull, chief claim agent of the Illinois Central, has been appointed general claim agent, the position of chief claim agent having been abolished. His office will continue to be at Chicago, Ill. Philip M. Gatch has been appointed assistant general claim agent with jurisdiction over lines south of the Ohio river, with offices at Chicago.

W. O. Bunger, freight claim agent of the Chicago, Rock Island & Pacific, has been appointed general superintendent of freight claims, in charge of loss and damage claims and their prevention, with office at Chicago, Ill. The office of freight claim agent has been abolished. F. W. Main, assistant freight claim agent, has been appointed auditor freight overcharge claims, with office at Chicago. G. W. Loderhose has been appointed assistant general superintendent of freight claims, with headquarters at Chicago. Effective December 1.

The Cincinnati, Indianapolis & Western on December 1 took over the operation of the line from Hamilton, O., to Springfield, Ill., and the branch from Sidell, Ill., to Olney, Ill., heretofore operated by the Cincinnati, Hamilton & Dayton. The new company will have trackage rights over the C., H. & D. between Cincinnati and Hamilton. The officers are as follows, and all will have headquarters at Indianapolis, Ind.: B. A. Worthington, president; C. F. Smith, assistant to the president; J. G. Moore, secretary and assistant counsel; F. B. Brown, auditor; D. J. Curran, treasurer; J. A. Simmons, general traffic manager; M. V. Hynes, general superintendent; H. F. Passel, chief engineer; Edward Boas, superintendent motive power; W. H. Betticher, master car builder; H. Lewis, manager purchases and supplies; J. L. Powell, superintendent car service and accounting; L. E. Smith, freight claim agent.

Operating

M. O. Connor has been appointed terminal trainmaster of the Georgia & Florida with office at Augusta, Ga.

D. J. Madden has been appointed trainmaster of the Mahoning division of the Erie, with headquarters at Cleveland, Ohio. Effective December 1.

H. J. Humphrey has been appointed acting superintendent of car service of the Canadian Pacific eastern lines with office at Montreal, Que., vice W. Fansley, transferred.

H. H. Morris, assistant superintendent of the Huntington and Big Sandy divisions of the Chesapeake & Ohio, at Huntington, W. Va., has resigned to go into other business.

G. L. Candler, superintendent of transportation, with office at Savannah, Ga., has been appointed general superintendent of the Central of Georgia, vice J. T. Johnson, deceased.

J. W. Smith, assistant superintendent of the Indiana Harbor Belt at Gibson, Ind., has been promoted to superintendent, and the office of assistant superintendent has been abolished.

H. E. McGee, trainmaster of the Missouri, Kansas & Texas, at Smithville, Tex., has been promoted to division superintendent with headquarters at Greenville, Tex. E. E. Hanna has been appointed trainmaster to succeed Mr. McGee at Smithville.

L. L. McIntyre, trainmaster of the Carolina, Clinchfield & Ohio at Erwin, Tenn., has been appointed superintendent, with office at Erwin. W. T. Wohlford, assistant trainmaster at Dante, Va., has been appointed trainmaster with office at Erwin, vice Mr. McIntyre.

W. R. Cahill, acting superintendent of the Missouri, Kansas & Texas, at Wichita Falls, Tex., has been transferred in the same capacity to Smithville, to take the place of C. A. Thanheiser, who has been given an indefinite leave of absence on account of ill health

John J. Mantell, superintendent of the Wyoming division of the Erie at Dunmore, Pa., has been appointed superintendent of ter-

minals, with offices at Jersey City, N. J., vice Eugene R. Allen, resigned. Augustus E. Ruffer assistant superintendent at Jersey City, has been appointed superintendent of the Wyoming division, vice Mr. J. J. Mantell, and Harold R. Cole succeeds Mr. Ruffer.

P. R. Albright, whose appointment as general manager of the Atlantic Coast Line, with headquarters at Wilmington, N. C., has already been announced in these columns, was born on June 26, 1866, at Greensboro, N. C., and was educated in the public schools. He began railway work on August 1, 1888, as a clerk to the general superintendent of the Cape Fear & Yadkin Valley, now a part of the Atlantic Coast Line. He subsequently served as chief clerk to the general superintendent and chief clerk to the general manager of the same road until September, 1898. He then organized the North Carolina Demurrage Bureau, and served as manager of that bureau until March 1, 1904. He went to the Atlantic Coast Line in March, 1904, as assistant to general manager. On November 17, 1914, he was appointed assistant general manager, which position he held at the time of his recent appointment as general manager of the same road, as above noted.

John Colin Murchison, who has been appointed general superintendent of the Atlantic Coast Line with headquarters at Jacksonville, Fla., as has already been announced in these columns, was born on September 8, 1867, at Gulf, N. C., and was educated in the public schools. He has began railway work on February 11, 1885, with the Cape Fear & Yadkin Valley, serving first as clerk and operator at Greensboro, N. C., and later as operator at Fayetteville. In May, 1886, he was appointed despatcher, and in September, 1890, was made master of trains. From February, 1899, to the following January he was trainmaster on the Atlantic Coast Line, and then for about five years was out of railway work. In 1905 he returned to the service of the Atlantic Coast Line as superintendent at Rocky Mount, N. C. Two years later he was transferred as superintendent to Wilmington, N. C., and from 1907 to 1915 served as superintendent at Charleston, S. C. On October 12, 1915, he was appointed assistant general superintendent at Jacksonville, Fla., and the following month was made general superintendent with headquarters at Jacksonville, of the same road, as above noted.

Traffic

Cecil Wray Johnston, whose appointment as assistant general passenger agent of the Grand Trunk, with headquarters at Montreal, Que., has already been announced in these columns, was born on July 27, 1879, at Actonvale, Que. He was educated in the Elementary School, Sherbrooke Academy, and St. Francis College, Richmond, Que. He began railway work on September 1, 1897, with the Grand Trunk, as clerk and operator at Richmond. In April, 1899, he was transferred as clerk to Berlin, N. H. From June, 1899, to the following November, he was relieving operator and agent at Island Pond, Vt., and Portland, Maine district. In December, 1899, he was appointed day operator at Sherbrooke, Que., and in March, 1900, became a clerk in the audit department at Montreal. From June, 1901, to June, 1902, he was ticket clerk, and then to December 31, 1904, was traveling passenger agent. On January 1, 1905, he was appointed excursion clerk at Montreal of the same road, and later was transferred to the Grand Trunk Pacific at Winnipeg, Man. He returned to the Grand Trunk in February, 1912, as chief clerk to the passenger traffic manager at Montreal. Two years later he was appointed assistant to passenger traffic manager at Montreal, which position he held at the time of his recent appointment as assistant general passenger agent of the same road, as above noted.

C. W. Johnston

H. C. Cassels has been appointed general agent of the Georgia & Florida with office at Augusta, Ga.

Julian Nance has been appointed district freight agent of the Union Pacific, with headquarters at Kansas City, Mo.

Frank W. Smith, a member of the Committee on Uniform Classification, with headquarters at Chicago, Ill., has been appointed a member of the reorganized Official Classification Committee, with headquarters at New York City. Before becoming a member of the Uniform Classification Committee Mr. Smith was for a period of 20 years connected with the New York, Ontario & Western, with office at New York City. His first position was that of general baggage agent, to which he was appointed on February 1, 1889. On September 1, 1893, he was appointed chief clerk in the general freight and passenger department. On December 30, 1902, he was made assistant general freight and passenger agent, in which position he served until September 15, 1908, when he was appointed to his present position as a member of the Uniform Classification Committee at Chicago. His new appointment as a member of the Official Classification Committee become effective on December 1.

F. W. Smith

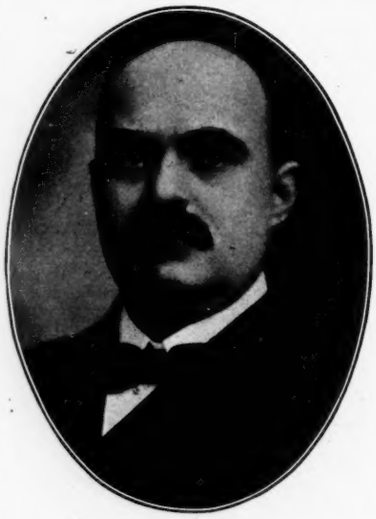
D. T. Lawrence, whose appointment as a member of the Official Classification Committee, with office at New York City, has been announced, was born at Marysville, Ohio, on July 20, 1871. He entered railway service in March, 1890, as an office boy in the general office of the Central New England & Western at Poughkeepsie, N. Y. He remained with this road at Poughkeepsie and Hartford, Conn., until November, 1892, in the successive capacities of office boy, stenographer and clerk. From November, 1892, until May, 1899, he was stenographer, clerk and soliciting agent for the National Despatch Fast Freight Line, at Boston, Mass. He was appointed New England agent of this line in May, 1899, at the same time assuming the duties of agent of the Great Eastern Fast Freight Line. In May, 1903, he was made manager of the National Despatch-Great Eastern Line, a consolidation of the National Despatch and the Fast Freight, with headquarters at Buffalo, N. Y. He remained in this position for eight years, with office first at Buffalo, N. Y., and later at Boston, Mass. In May, 1911, he was appointed general freight agent of the Central Vermont with headquarters at St. Albans, Vt.

D. T. Lawrence

W. V. Powell has been appointed industrial commissioner of the St. Louis Southwestern, with office at St. Louis, Mo., in charge of industrial and immigration matters. W. R. Beattie,

agricultural and industrial commissioner, has been relieved of the duties pertaining to industrial and immigration matters and will hereafter hold the position of agricultural commissioner.

Wallace S. Cookson, whose appointment as general passenger agent of the Grand Trunk, with headquarters at Montreal, Que., has already been announced in these columns, was born on June 12, 1871, at Port Jervis, N. Y., and was educated in the public schools. He began railway work in 1887, with the Erie; from 1890, to 1899, he was assistant ticket agent on the Chicago & Western Indiana. From 1899, to May, 1909, he served as chief clerk in the general passenger department of the Grand Trunk at Chicago. On May 1, 1909, he was appointed assistant general passenger agent of the Grand Trunk, with office at Chicago. He was transferred as assistant general passenger agent in June, 1910, to Montreal, Que., remaining in that position until his recent appointment as general passenger agent of the same road, as above noted.



W. S. Cookson

H. P. Barlow has been appointed right of way commissioner of the Chicago, St. Paul, Minneapolis & Omaha, with office at St. Paul, Minn. Effective December 1.

C. A. Leggo has been appointed right of way agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn. Effective December 1.

Henry R. McLean, contracting freight agent of the Central of Georgia at Atlanta, Ga., has been appointed commercial agent with office at Macon, vice W. B. Morgan, transferred.

Harry Gower, freight traffic manager of the Chicago, Rock Island & Pacific, with office at Chicago, Ill., retired from service on December 1. Mr. Gower was born in England on May 31, 1853, and entered railway service in 1878, as a clerk in the auditing department of the Rock Island. He has remained with the same railroad ever since, in the consecutive capacities of chief clerk, freight auditing department, until October 7, 1881; chief clerk, general freight department, October 7, 1881, to April, 1887; second assistant general freight agent, April, 1887, to March 1, 1888, first assistant general freight agent, March 1, 1888, to March, 1896; general freight agent, March, 1896, to March 1, 1899; assistant freight traffic manager, March 1, 1899, to January 15, 1906; and of freight traffic manager, January 15, 1906, to December 1, 1915.

H. Gower

S. H. Johnson, assistant freight traffic manager of the Chicago, Rock Island & Pacific, has been promoted to freight traffic manager to succeed H. Gower, resigned. Effective December 1.

C. C. Graves, traffic manager of the Carolina, Atlantic & Western and the Charlotte, Monroe & Columbia at Hamlet, N. C., has been appointed assistant general freight agent of the Seaboard Air Line with headquarters at Hamlet.

George H. Corse, Jr., special agent of the passenger department of the Union Pacific System, has been appointed foreign passenger agent of the system. His office will remain at Chicago, Ill., and his new appointment was effective November 29,

In the sketch of Benton M. Bukey, published in our issue of November 26, page 1028, a number of typographical errors occurred. The correct sketch follows: Benton M. Bukey has been appointed assistant general passenger agent of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, Ill. Mr. Bukey was born at Williamstown, Wood County, W. Va., on November 6, 1879. He received a high school education in Washington, D. C., and entered railway service in that city on November 18, 1899, in the accounting department of the Southern. He remained in Washington until July, 1903, when he entered the employ of the Chicago, Burlington & Quincy, in the office of the auditor of ticket accounts, at Chicago, Ill. In November, 1904, he became a rate clerk in the passenger department of the same road, and in April, 1905, went to St. Louis, Mo., to perform the same kind of service for the Missouri Pacific. He was in the service of the Missouri, Kansas & Texas in the same capacity from August, 1906, to October, 1906. Since that time he has been continuously in the passenger department of the Santa Fe at Chicago, Ill. In September, 1908, he was promoted from rate clerk to chief rate clerk, and in September, 1909, was appointed chief clerk to the passenger traffic manager, the position which he held up to the time of his recent promotion.

Engineering and Rolling Stock

G. F. Shull, acting master mechanic of the Carolina, Clinchfield & Ohio at Erwin, Tenn., has been appointed master mechanic, with office at Erwin.

E. F. Gates, assistant signal supervisor of the Portland division of the Boston & Maine, has been appointed signal supervisor succeeding George W. Hayward, deceased.

Ed. Sheffield, assistant signal supervisor of the Texas & New Orleans during the leave of absence of L. H. Feldhake, has been appointed acting signal supervisor of the Houston & Texas Central.

L. Finegan, superintendent of shops of the Baltimore & Ohio at Glenwood, Pittsburgh, Pa., has been appointed superintendent of shops at Mount Clare, Baltimore, Md., vice P. Conniff, assigned to other duties.

A. A. Kurzejka has been appointed chief carpenter of the Iowa and Minnesota division of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., vice Michael Caton, resigned on account of ill health.

H. A. English has been appointed master mechanic of the Canadian Northern, Central division, with office at Winnipeg, Man., vice G. H. Hedge promoted. C. J. Quantic has been appointed master mechanic of the Pacific division, with office at Port Mann, B. C.

E. A. Cuthbertson, signal inspector of the Northern Pacific, with headquarters at Sand Point, Ida., has been appointed supervisor of signals for the lines east of Mandan, N. D., succeeding W. M. O'Laughlin, resigned to accept a position with the Interstate Commerce Commission.

OBITUARY

George Hayward, supervisor of signals of the Connecticut & Passumpsic division of the Boston & Maine, Springfield, Mass., died on October 20, 1915, from injuries caused by a fall from a signal ladder.

Walter J. Bell, who was superintendent of the Columbus division of the Southern Railway at Williamson, Ga., previous to January, 1914, died on November 22, at his home in Atlanta, Ga., at the age of 58.

Indian Railway Enlistments.—The report of the South India Railway states that out of a staff of 83 European officers 16 have volunteered for and have joined the army for active service, as have also 21 European and four native subordinates of the Indian establishment, and two men from the London office.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE DETROIT, TOLEDO & IRONTON is in the market for a number of heavy freight locomotives.

THE DULUTH & IRON RANGE has ordered three Mikado type locomotives from the Baldwin Locomotive Works.

THE CARNEGIE STEEL COMPANY has ordered one six-wheel switching locomotive from the American Locomotive Company.

THE LAKE ERIE & NORTHERN has ordered three electric locomotives from the Westinghouse Electric & Manufacturing Company.

THE TUCSON, CORNELIA & GILA BEND has ordered one Mogul type and one switching locomotive from the American Locomotive Company, and is in the market for four more locomotives. John C. Greenway, general manager, Gila Bend, Ariz.

THE DULUTH, MISSABE & NORTHERN, reported in the *Railway Age Gazette* of November 19 as inquiring for prices on two Mallet and four Santa Fe type locomotives, has ordered two Mallet and six Santa Fe type locomotives from the Baldwin Locomotive Works.

THE CALUMET & ARIZONA MINING COMPANY has ordered one Mogul type locomotive and one 6-wheel switching locomotive from the American Locomotive Company. The Mogul type locomotive will have 19 by 26-in. cylinders, 56-in. driving wheels and a total weight in working order of 140,000 lb., and the switching locomotive will have 19 by 26-in. cylinders, 50-in. driving wheels and a total weight in working order of 133,000 lb.

CAR BUILDING

THE LEHIGH VALLEY is in the market for 500 automobile cars.

THE MISSOURI, KANSAS & TEXAS is inquiring for prices on 1,000 stock cars.

THE ATCHISON, TOPEKA & SANTA FE is reported as inquiring for 25 concentrate cars.

THE DELAWARE & HUDSON is in the market for 1,000 underframes for twin hopper coal cars.

THE RUTLAND is in the market for freight cars and is asking prices on 1,000, 2,000 or 5,000 cars.

THE MISSOURI, KANSAS & TEXAS is in the market for 4 dining cars, 2 postal cars and 15 baggage cars.

THE DULUTH & IRON RANGE has ordered 250 50-ton ore cars from the American Car & Foundry Company.

THE UTAH COPPER COMPANY is reported to have ordered 100 ore cars from the Pressed Steel Car Company.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 1,000 box cars from the American Car & Foundry Company.

THE PENNSYLVANIA RAILROAD has ordered 12 combination baggage and mail cars, and six dining cars from the Pullman Company.

THE PENNSYLVANIA RAILROAD has withdrawn its recent inquiry for freight cars, it having been found that the prices quoted were too high.

THE MINNEAPOLIS & ST. LOUIS, which recently ordered 500 box cars from the Bettendorf Company, is now inquiring for 1,000 additional box cars.

THE DULUTH, MISSABE & NORTHERN has ordered 1,000 50-ton ore cars from the Western Steel Car & Foundry Company and 200 50-ton general service cars from the Pullman Company.

THE GEORGIA SOUTHERN & FLORIDA has ordered 2 combination passenger and baggage cars from the Pressed Steel Car Company and 130 40-ton gondola and 373 30-ton steel underframe box cars from the Lenoir Car Works.

THE INTERBOROUGH RAPID TRANSIT, reported in last week's issue of the *Railway Age Gazette* as having given the Pullman Company an order for 311 subway car bodies, has also ordered 405 trailer trucks and 246 motor car trucks from that company.

THE NEW YORK, NEW HAVEN & HARTFORD has authorized the Osgood-Bradley Company to proceed with the construction of 50 baggage cars, 5 postal cars, 10 combination baggage and smoking cars, 5 combination baggage and mail cars, 10 smoking cars and 20 coaches, all of which will be of all-steel construction.

THE CENTRAL RAILROAD OF NEW JERSEY was incorrectly reported in an item in the *Railway Age Gazette* of November 5 as having given the Standard Steel Car Company an order for 1,000 box cars, 1,000 hopper cars and 250 insulated box cars for ice. The company's orders were for 3,250 cars and were as follows: Pressed Steel Car Company, 1,000 110,000-lb. capacity hopper cars; Standard Steel Car Company, 1,000 110,000-lb. capacity hopper cars and 500 box cars; American Car & Foundry Company, 500 box cars and 250 insulated ice cars.

IRON AND STEEL

THE CHICAGO & EASTERN ILLINOIS has ordered 10,000 tons of rails from the Illinois Steel Company.

THE MISSOURI, KANSAS & TEXAS has ordered 15,000 tons of rails from the Illinois Steel Company.

THE SOUTHERN PACIFIC has ordered 20,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

THE ST. LOUIS, IRON MOUNTAIN & SOUTHERN, B. F. Bush, receiver, has been authorized by the federal court to expend $175,000 for rails.

THE CHICAGO, BURLINGTON & QUINCY has purchased 15,000 tons of 90-lb. rails from the Colorado Fuel & Iron Company in addition to the tonnage reported on October 1.

THE MISSOURI PACIFIC, B. F. Bush, receiver, has been authorized by the federal court to expend $530,630 for new rails and $273,220 for the improvement of roadway and equipment.

TRACK SPECIALTIES

THE CHICAGO, BURLINGTON & QUINCY has ordered 6,000 tons of tie plates from the Interstate Iron & Steel Company and 1,200 tons from the Railroad Supply Company.

MACHINERY AND TOOLS

THE GREAT NORTHERN is in the market for the following list of machines and tools: One 16-in. motor-driven engine lathe with a 12-ft. bed; one 28-in. upright swing drill press with revolving table (not geared) and one 2-h.p. 250-volt d.c. motor to be belted to the driving pulley; two motor-driven pipe-threading machines with tools and motors; one 24-in. stroke shaper without traveling head, with tools and motor; one motor-driven, square base, emery grinder; one 48-in. by 6-in. motor-driven grinding stone with cast iron trough and motor; one 1,500-lb. single-frame steam hammer, with tools and one set of steel dies; two 50-in. by 54-in. by 24-in. square base, steel, stationary blast forges; one 18-in. motor-driven, vertical, wood-boring machine with adjustable table, having attachment for boring angles; one motor-driven, iron box frame rip-saw table, with attachment for raising table and cutting bevels, one motor-driven, 30-in. engine lathe with 18-ft. bed; one motor-driven, half universal radial drill with capacity to drill 2-in. holes, complete with tools and motor.

SIGNALING

THE EL PASO & SOUTHWESTERN proposes to install automatic block signals during the coming year on its line between Lee, Ariz., and Moores Spur, 25 miles.

THE SAN PEDRO, LOS ANGELES & SALT LAKE plans to install automatic block signals during the coming year on its line between Los Angeles, Cal., and Riverside, 58 miles. A manual interlocking plant is being put in at Magnolia avenue, Riverside, where the line is crossed by the Pacific Electric Railway. This machine will have 12 levers.

Supply Trade News

The Pere Marquette is inquiring for 500,000 ft. of lumber for car repairs.

The Western Electric Company has moved its Detroit headquarters from 263 Franklin street to larger quarters at Kirby and Dequinde streets.

The Chicago, Milwaukee & St. Paul has purchased 2,000,000 ft. of fir car decking on the Pacific coast. The lumber will be used in the Milwaukee shops.

The Electric Cable Company announces the opening of a western sales office at 122 South Michigan avenue, Chicago, Ill., in charge of James M. Brown, manager.

W. B. Wise, New York manager of the Adams & Elting Company, Chicago, has been appointed assistant to the president of Flint & Chester, Inc., with headquarters in New York.

L. H. Zintgraff & Co. is the name of a new company which has been established with an office at 200 Security Building, St Louis, Mo., to deal in foundry, mine and mill supplies.

George R. Henderson, consulting engineer of the Baldwin Locomotive Works, has resigned from that position and opened an independent office as consulting engineer at 1321 Walnut street, Philadelphia.

The directors of the Baldwin Locomotive Works have declared the regular semi-annual dividend of 3½ per cent on the preferred stock, payable January 1, but no dividend has been declared on the common stock.

Benjamin M. Jones, president of B. M. Jones & Co., Inc., Boston, Mass., died at his home in Boston, November 26, age 78 years. Mr. Jones early entered the metal importing business, and dealt largely in railroad specialties.

Frank R. Peters, formerly with J. Stone & Co., London, has joined the electrical staff of the Franklin Railway Supply Company. This company has also secured the services of C. B. Little, one of the electrical engineers of the Baltimore & Ohio.

Flint & Chester, Inc., New York, have taken the exclusive sales agency for the United States and Canada for the National Graphite Lubricator Company, Scranton, Pa. The lubricators made by the latter have been adopted by 11 railroads and installed on 40 others.

The Chicago Railway Signal & Supply Company has completed arrangements for the opening of branch offices, as follows: F. N. Rumbling, to be known as Southern Pacific Coast representative, will be located in the Pacific Electric Building, Los Angeles, Calif.; S. J. Stjernstedt Pacific Coast representative, in 502 Rialto Building, San Francisco, and the Pacific Northwest representative is W. Frank Carr, Central Building, Seattle, Wash.

The National Lumber & Creosoting Company has established an office at 1209 Commerce building, Kansas City, Mo., in charge of M. K. Trumbull, vice-president, who was formerly principal assistant engineer of the Chicago & Western Indiana, and the Belt Railway of Chicago. He has been vice-president of the National Lumber & Creosoting Company for the past two years. The company's special lines are cross ties, switch ties, piling, poles, timbers, lumber, fence posts, etc., creosoted and untreated.

An opinion filed November 20 by the United States Circuit Court for the First District holds that the non-metallic flexible conduit or tubing, known as Duraduct, manufactured by the Tubular Woven Fabric Company, Pawtucket, R. I., is an infringement of the letters patent of H. G. Osburn, owned by the National Metal Molding Company, of Pittsburgh. The suit was first heard by the United States District Court of Rhode Island, and then taken to the Court of Appeals, the decision of which is final.

The Roberts & Schaefer Company, Chicago, has been awarded a contract by the Oregon-Washington Railroad & Navigation Company to build a coaling plant at The Dalles, Ore. It will be a reinforced concrete, fireproof, 150-ton plant with weighing facilities to record all coal passing to locomotives on two tracks, complete with sand handling equipment. This will be the third structure of this kind being erected for this company. The contract price will be $16,500. The Roberts & Schaefer Company will also design and build a counterbalanced bucket locomotive coaling plant for the Canton car shops of the Pennsylvania at Baltimore.

A change has been made in the control of the Reed-Prentice Company, manufacturers of machine tools, Worcester, Mass., a majority interest in the company having been acquired by investors headed by Robert F. Herrick, president of the Pacific Mills, chairman of the Saco-Lowell Shops, and an officer of other large corporations. On November 26 new directors were elected as follows: Robert F. Herrick, Malcolm Donald, Robert C. Morse, Henry P. Kendall, George C. Lee, Frank A. Drury, Homer Gage and Albert E. Newton. New officers have also been elected as follows: Robert F. Herrick, president; Jeremiah J. Mackin, treasurer and clerk; Charles M. Thayer, general counsel. Albert E. Newton will retain his position as vice-president and general manager.

The Westinghouse Electric & Manufacturing Company announces a number of changes in the supply department, which have recently been put into effect. S. A. Chase, formerly special representative; T. J. Pace, formerly in charge of the illuminating and rectifier divisions, and Carl G. Schluederberg, formerly head of switchboard sales, have been appointed assistants to the manager, J. J. Gibson. C. E. Stephens, engineer of lighting, has been appointed manager of the illuminating section to succeed Mr. Pace. C. Streamer, formerly head of the order division, succeeds Mr. Schluederberg as manager of the switchboard section, and A. P. Joseph is appointed head of the order section to succeed Mr. Streamer. M. C. Morrow, formerly of the Philadelphia office, is appointed manager of the appliance section, which is a combination of the former heating, fan, motor and ozonizer divisions of the supply department. M. C. Rypinski, formerly manager of the D. and S. division of the New York office, becomes manager of the meter section. The power department, E. H. Sniffin, manager, also announces the following section managers: W. H. Garrett, contracts; J. G. Worker, stokers, and H. D. Storer, auxiliaries.

TRADE PUBLICATIONS

Bond Wire Protectors.—The P. & M. Company, Chicago, has issued a pamphlet describing its bond wire protectors and their method of installation, with sketches and photographs showing their manner of application to the various types of joints.

Corrugated Culverts.—The Canton Culvert & Silo Company, Canton, Ohio, has issued standard specifications for corrugated metal culverts for use by railway engineers using this form of construction. These specifications are not limited to any single style of culvert, but are intended to insure first class material and workmanship.

Daylight and Ventilation.—The Detroit Steel Products Company, Detroit, Mich., has issued a booklet containing information concerning the construction of roundhouses, trainsheds, machine shops, freight houses and other railway structures, with special reference to the facilities for securing light and ventilation. The book also contains a number of illustrations showing typical railway structures in which "Fenestra" products have been used.

The Popular Parcel Post.—No less than 500 additional men will assist the regular force of United States railway mail employees [in New England] in handling the Christmas mail rush this year. Superintendent Van Dervoort, of the railway mail service, says that there is unmistakable evidence that the mail rush will be heavy. The parcel post mail it is expected will be greater than ever, due principally to the increase of the weight limit to 50 pounds. One innovation this year will be the service of extra trains between New York and Boston to carry Christmas mail, which will be "worked" during the trip. This will lighten the work of the clerks at the railroad terminals. Extra postal spaces have been procured in the railroad stations in Boston, Worcester, Albany, White River Junction, Portland and Bangor. Postmaster Murray plans to have 300 extra clerks and carriers at work. These men will be drawn from the civil service eligible list.—*Boston Journal.*

Railway Construction

BALTIMORE & OHIO.—Application has been made to the Public Service Commission of Maryland, it is said, for permission to build, under the name of the Washington County Railroad, a single track line from Hagerstown, Md., to Security, about 3.5 miles. It is estimated that it will cost about $110,000 to build the line.

CHARLES CITY WESTERN (ELECTRIC).—This company, which operates a 13-mile line from Charles City, Iowa, southwest to Marble Rock, has completed work on an extension from Charles City to Colwell, eight miles.

CUMBERLAND & MANCHESTER.—A contract has been given to the Read Construction Company, Barbourville, Ky., to build from Barbourville, Ky., north to Manchester, 24 miles, and construction work is now under way. Charles F. Heidrick, president, Barbourville, Ky. (June 25, p. 1497.)

DULUTH & NORTHERN MINNESOTA.—Work is now under way on an extension from Harlan, Minn., to Temperance river, 7 miles.

EASTERN PENNSYLVANIA RAILWAYS.—See Pottsville & St. Clair.

HELENA SOUTHERN.—This company is the successor of the Three Forks, Helena & Madison Valley, which was organized to build from Helena, Mont., south to Yellowstone National Park, about 150 miles. On the section from Three Forks to Radersburg, 25 miles, about 15 miles has been graded. Construction work has been suspended but will probably be resumed by January, 1916. E. A. Tennis, president, Salina, Kan.

HUDSON BAY RAILWAY.—Construction work is now under way by J. D. McArthur, Winnipeg, Man., building from mile 241 to the Hudson Bay terminus at mile 424, in the province of Manitoba.

KANSAS CITY, MEXICO & ORIENT.—Construction work on the 17 miles from San Angelo, Tex., south to Cristoval, may be carried out next spring and the section completed by July 1, 1916. This is the first section of the branch projected from San Angelo south via Cristoval, Eldorado and Sonora to Del Rio, about 160 miles. Grading work has already been finished on 94.6 miles and track laid on 2.7 miles.

MANTAWNEY RAILROAD.—An officer writes that grading work is now under way on the line building from Stowe, Pa., northeast to Allentown and Bethlehem, 52 miles. The Highley Construction Company has the contract to build the line. A. E. Lehman, chief engineer, 717 Walnut Street, Philadelphia.

MARSHALL & EAST TEXAS.—This company now operates a line from Winnsboro, Tex., southeast to Elysian Fields, 91.7 miles. It has projected and partly surveyed an extension from Winnsboro to Paris, 60.5 miles, also an extension from Elysian Fields to the Sabine river, 98 miles.

NEW IBERIA & NORTHERN.—This company, which operates a line from Port Barre, La., southeast to Shadyside, 88 miles, has projected an extension from Oaklawn to New Orleans, 93.5 miles. An extension is also projected from Port Barre to the Sabine river, 107 miles.

NEW YORK SUBWAYS.—The Coast & Lake Contracting Corporation submitted the lowest bid at $53,930 for the installation of tracks on the White Plains road extension of the Lenox avenue branch of the existing subway. This work is in the borough of the Bronx. (November 12, p. 923.)

OZARKS RAILWAY.—Surveys have been made, and it is expected that actual construction work will be started in December on the line from Rothville to Mountain Home, Ark., 10 miles. The contract has been given to the Blodgett Construction Company, Kansas City. K. V. Loba, president, Mountain Home. (September 3, p. 449.)

PELHAM & HAVANA.—Construction work is now under way on the extension from Darsey, Fla., southwest to Havana, 6 miles. The company now operates 19.3 miles from Cairo, Ga., southwest to Darsey, Fla. (August 6, p. 257.)

POTTSVILLE & ST. CLAIR ELECTRIC.—Grading work is now being carried out by the J. G. White Engineering Corporation on a line from Pottsville, Pa., to St. Clair, 2.3 miles. The work involves handling about 5,000 cu. yd. to the mile, 60 per cent of which will be hard shale. There will be five steel bridges on the line of from 60 ft. to 80 ft. each. Contracts for the steel superstructures of three bridges are yet to be let. The line will provide a short route for the Eastern Pennsylvania Railways. W. B. Rockville, president, Pottsville. (October 29, p. 828.)

SALINA NORTHERN.—Work is now under way on the section of this road from Lincoln Center, Kan., northwest to Osborne and Downs, 60 miles. The company now operates 36 miles of line from Lincoln Center southeast to Salina. The contractors include: A. J. Canaday; Eby Construction Company; Dick Eastes; E. S. Kelly; A. H. Carter; W. Burton; D. E. Dutcher; P. H. Smith and A. M. Colvin, all of Lincoln, Kan. An extension is projected from Salina south to Wichita. Surveys are being made for second track work between Lincoln and Osborne and Downs, on 10 miles.

SOUTH DAKOTA ROADS.—John Rosholt, Minneapolis, Minn., is said to be back of a project to build a line from Bruton, S. D., to Ortonville, Minn.

TEXAS, OKLAHOMA & EASTERN.—An officer writes that this company has built during 1915 about 30 miles of temporary logging roads in Oklahoma.

THREE FORKS, HELENA & MADISON VALLEY.—See Helena Southern.

TRINITY VALLEY & NORTHERN.—This company, which operates a line from Dayton, Tex., north to Lumm, 18 miles, has projected an extension from Lumm to Lamb, nine miles.

WASHINGTON COUNTY.—See Baltimore & Ohio.

WEST FORK LOGGING COMPANY.—This company has completed a branch railroad, running from West Fork, Wash., where it connects with the Tacoma Eastern, one and one-half miles up the east fork of the Tilton river. The company's five-mile spur up the west fork is, at the present time, being extended one mile farther. Construction work is being done by company forces, and Tacoma & Eastern equipment is used. L. T. Murray, president, Lindberg, Wash.

RAILWAY STRUCTURES

BALTIMORE, MD.—The Baltimore & Ohio has let contracts for the construction of the large new coal pier at Curtis Bay, Baltimore, to cost about $1,500,000 as follows: For the dredging work and building the superstructure and bulkhead to H. S. Kerbaugh, Inc., Baltimore and New York; the grading work will be done by Smith-McCormick, Easton, Pa. The conveying machinery will be furnished by the Robbins Belt Company, New York, while the car dumpers will be installed by the McMyler Interstate Company, Cleveland. The thawing shed, in which the coal in carloads will be placed in cold weather prior to being dumped over the pier, will be built by the Surety Engineering Company, New York. It is intended to use reinforced Gunite applied by the cement gun on the walls of the building, the apparatus and crew for applying the Gunite being furnished by the Cement-Gun Company, Inc., New York. All the work will be started at once, and it is expected that the new improvement will be ready for operation during the season of 1916. The pier will have a capacity of 10,000,000 tons a year. (September 24, p. 855.)

BRONXVILLE, N. Y.—A contract has been let to the Transit Construction Company, Mt. Vernon, N. Y., by the New York Central, for the elimination of the grade crossing over the Harlem division tracks at Pondfield road, Bronxville.

CHICAGO, ILL.—The general contract for the new freight house and warehouse which is being built for the Pennsylvania lines, has been awarded to the George A. Fuller Company of Chicago, Ill. The total cost of the building will be about $2,500,000.

The Chicago & North Western has awarded the general contract for its new grain elevator at 118th street and Calumet river to the Witherspoon Engler Construction Company of

Chicago, Ill. The elevator proper will be a reinforced concrete structure, having a river house frontage of 270 ft. for receiving and delivering grain from and to boats, a series of 39 circular storage bins in the rear of the river house, a working house 77 ft. by 287 ft. in the rear of the bins, and a track shed covering four tracks in the rear of the working house. The combined storage capacity of all the bins will be 2,500,000 bushels, and plans permit the future construction of additional bins until an ultimate capacity of 10,000,000 bushels is reached. The marine leg will allow the removal of grain from boats to any port of the elevator at the rate of 20,000 bu. an hour and the loading of grain from the elevator into vessels at the rate of 120,000 bu. an hour. The four-track receiving yard will have a capacity of 300 cars and the storage yard a capacity of 600 cars. The elevator will be fitted to receive 120,000 bu. an hour from cars. About 5,000 tons of steel will be used in construction of the elevator. The Armour Grain Company has arranged to lease the structure when completed.

Clarion, Iowa.—The Chicago Great Western has let a contract to John Jacobson, of Marshalltown, Iowa, for the construction of an icehouse, which will have the same specifications as the one to be built at Council Bluffs. (See item under Council Bluffs, Iowa.)

Council Bluffs, Iowa.—The Chicago Great Western has let a contract to John Jacobson, of Marshalltown, Iowa, for the construction of a one-story, timber icehouse, with a cinder floor and J. M. asbestos roofing. The building will be 34 ft. wide by 63 ft. long, and will cost about $5,000.

Freeport, Ill.—The Illinois Central has completed plans for the enlargement of a roundhouse and the extension of a tool house. Three 90-ft. stalls will be added to the roundhouse and 14 stalls will be lengthened from 90 ft. to 100 ft., at a probable cost of about $30,000. The addition to the tool house will be a one-story brick structure, 38 ft. by 62 ft. Construction work has been deferred until next spring.

Gray Bull, Wyo.—The roundhouse of the Chicago, Burlington & Quincy, recently destroyed by fire, is now being replaced. The new structure will consist of five 81-ft. stalls, and is being built of timber at a probable cost of about $5,000. Company forces are doing the work.

North Platte, Neb.—The Union Pacific station, baggage room and hotel burned to the ground on Tuesday evening, November 16. The company began the construction of a temporary frame building the morning after the fire, and plans are now being prepared for a permanent structure. The loss has been estimated at $50,000.

Pembroke, Va.—Officers of Giles county have appropriated $8,400, it is said, for the construction of a bridge across New river. It is understood that the Norfolk & Western will pay $10,000 additional towards the cost of the bridge.

Plainsboro, N. J.—The Pennsylvania Railroad is building a highway bridge over its tracks at Plainsboro, to replace the present structure.

Sioux City, Iowa.—C. W. Ginby & Co., of Chicago, Ill., have received a contract to build a freight house for the Chicago & North Western. It will be a brick structure 40 ft. by 1,050 ft., 238 ft. of which will be 2 stories high and the remainder 1 story. The roof will be supported by steel trusses. The total cost of the building, including all incidental improvements, will be about $175,000.

The Railways in Sweden.—The management of the government-owned railroads in Sweden has already prepared its budget for 1917, and is asking for an appropriation of $1,894,700 for new construction work, which is $400,000 more than it obtained for 1916. It is planning its construction work two years ahead.

Scottish Train Services Curtailed.—The passenger train services of the Caledonian and North British Railway Companies since Monday, November 15, have been somewhat curtailed. The curtailment has been brought about by so many employees of the companies having joined the colors and the tax imposed on the resources of the companies in the matter of locomotive power and rolling-stock in meeting the present abnormal requirements. The English services are not affected.

Railway Financial News

Atchison, Topeka & Santa Fe.—This company is to sell through J. P. Morgan & Co., $10,000,000 preferred stock at 98½. The preferred stock pays dividends at the rate of 5 per cent. On June 30, 1915, the company had outstanding $114,173,730 preferred stock.

Baltimore & Ohio.—This company has sold $60,000,000 refunding and general mortgage 5 per cent bonds to Kuhn, Loeb & Co. and Speyer & Co., both of New York, at 97. The syndicate which will participate in the underwriting of these bonds will get their bonds at 98, and an offering will be made to the public at a price probably in the neighborhood of par. These are the first bonds to be issued under the new refunding and general mortgage. In the letter which Daniel Willard, president of the Baltimore & Ohio, wrote to the bankers who have taken the bonds, the following paragraphs occur:

"The refunding and general mortgage will be secured on practically the entire system of railroads of the Baltimore & Ohio, comprising about 4,486 miles of first track, about 1,257 miles of second track and about 3,318 miles of other track and upon the equipment of the company, or its interest therein, having a present net value after depreciation of over $79,000,000. It will further cover the passenger and freight terminals of the company in Philadelphia, Baltimore, Pittsburgh and Chicago and the freight terminals at Staten Island, N. Y., in Cincinnati and Washington, as well as the company's one-half stock interest in the Washington Terminal Company and its one-half ownership of the joint yards at Washington.

"The mortgage will be a direct lien on about 2,272 miles of first track, 605 miles of second track and 1,761 miles of other track of the above mentioned mileage and a lien, through the deposit of bonds, and in most cases all, and in no case less than 96 per cent of the capital stock of each of the companies owning the same upon the remaining mileage.

"The 4½ per cent convertible gold bonds of the company, amounting to $63,250,000, in accordance with the terms thereof, will be secured pari passu with the bonds issued under the new refunding and general mortgage."

Of the proceeds of the sale of these bonds, $40,000,000 will be used to refund a like amount of notes maturing in 1917 and 1918.

Chesapeake & Ohio.—Montgomery, Clothier & Tyler, New York, are offering $1,000,000 Chesapeake & Ohio Northern first mortgage 5 per cent bonds of October 1, 1915-1945, guaranteed principal and interest by the Chesapeake & Ohio. The Chesapeake & Ohio Northern is a subsidiary of the Chesapeake & Ohio, which is building a bridge across the Ohio river and 30 miles of railroad, to give the Chesapeake & Ohio a direct connection to Toledo and the Lakes in connection with the Hocking Valley, which is controlled by the Chesapeake & Ohio. The Chesapeake & Ohio has subscribed at par, to be paid in cash, for $3,000,000 of the authorized $3,500,000 stock of the Chesapeake & Ohio Northern. The bonds are secured by a closed mortgage and represent one-fourth or less of the actual cost of the property on which they are secured.

Chicago, Rock Island & Pacific.—The debenture bondholders' protective committee now asks the deposit of the 5 per cent debenture bonds, on which interest is in default, with the Bankers Trust Company, of New York, or the First Trust & Savings Bank, of Chicago. When the committee was first formed, deposits were not asked for.

Cincinnati, Hamilton & Dayton.—The bondholders' protective committee, Charles H. Sabin, chairman, has notified bondholders who have deposited their bonds that the committee proposed to sell deposited bonds at $700 per $1,000 bond to Kuhn, Loeb & Co. Any bondholder who desires to withdraw his bonds may do so before December 15 on the payment of $6.30 per bond to cover the expenses of the committee.

New Orleans, Texas & Mexico.—This property has been sold under foreclosure for $6,000,000 to representatives of the reorganization committee.